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REFRIGERATION PATENTS

Complete Record of Court Proceedings
in Frigidaire-Absopure Patent Suit
Offered in Special Supplement

One Dollar Per Copy

THE complete proceedings of the Federal Court in the famous patent suit of Frigidaire Corporation versus General Necessities Corporation tried at Bay City, Michigan, March 18 to 23, 1929, as published in the March 27 and April 10 issue of Electric Refrigeration News, have been reprinted in the form of a forty-eight page supplement.

Note: The official decision of Judge Arthur J. Tuttle (not previously published in the News) is included in the record.

A most interesting historical document and a clear explanation of the scientific laws on which mechanical refrigeration is based.

Only a limited number of copies of this special supplement are available. Orders should be entered immediately. Price one dollar per copy postpaid. Remittance must accompany order.

I am interested in the patent situation which, in my opinion, you are covering better than any trade publication I know.—W. A. Steiger, Westinghouse Electric & Mfg. Co., Philadelphia, Pa.

You are to be congratulated for publishing such an attractive paper as Electric Refrigeration News. I was particularly interested in reading through the details of the Frigidaire vs. General Necessities case. You certainly covered this admirably, and inasmuch as several of the witnesses were men whom I have known for a great many years, I found the story most fascinating.—Louis Ruthenburg, president and general manager, Copeland Products, Inc., Detroit, Mich.

I also must congratulate you on the completeness of your report on the patent suit between Absopure and Frigidaire at Bay City.—Wm. Robt. Wilson, Allied Motor Industries, Inc., Detroit, Mich.

We believe that every distributor, dealer and retail salesman will find the patent trial between Frigidaire and Absopure particularly illuminating and educating. A very thorough history of refrigeration with perhaps a few selling points is included as part of the testimony.

The trial was held at Bay City, Michigan, by Federal Judge Tuttle. Details the judge

found difficult to understand are, no doubt, the same which are puzzling many others. We believe that a careful reading of the questions and answers will be well worth the effort.—Refrigeration Dept., General Electric Co., Cleveland, O.

Please accept my hearty congratulations on your issue of the 27th ult. Your paper has indeed again shown its great value to the industry by your publishing the proceedings of the suit of the "Frigidaire Corporation, plaintiff, vs. General Necessities Corporation," given before Judge A. J. Tuttle.—Fremont Wilson, consulting engineer, New York, N. Y.

We compliment the Electric Refrigeration News for obtaining and publishing these proceedings. Aside from helping the average man to obtain a clearer idea of what refrigeration processes are like, one cannot help but be impressed with the thought of the years, the time and the effort pioneers devoted to solving this problem of creating cold by artificial means.—Copeland Ice Cube, Jr.

I have heard many favorable comments on your action in publishing full information respecting this suit. It will clear away a great deal of the misapprehension that exists in respect to the patent situation.—H. R. Van Deventer, New York, N. Y.

COMMENTS OF READERS

Electric Refrigeration News

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FIRE UNDERWRITERS SUBMIT RULES FOR MULTIPLE SYSTEMS

Revised Regulations Offered for Comment and Criticism

FOLLOWING a meeting called by the National Board of Fire Underwriters in New York City, July 31, which was attended by engineers representing manufacturers of electric refrigeration equipment and at which a tentative draft of regulations for the installation of multiple refrigerating system was presented, the proposed regulations have been revised and submitted to the representatives for further comment and criticism. Following is a copy of the revised regulations:

1. Application of Rules.

The following regulations are intended to apply to the installation and operation of multiple refrigerating systems as herein defined.

2. Multiple Systems Defined.

The term "multiple refrigerating system" shall be meant to mean and include all systems in which refrigerant from a common source is delivered direct to two or more separate cabinets each containing one or more evaporators.

3. Inspection and Approval.

No multiple system shall be placed in operation until the complete installation has been inspected, tested and a certificate of approval issued by the authority enforcing these regulations. Such certificate of approval shall be posted on the premises where the system is installed.

4. Capacity Limitation.

(a) No multiple system shall contain more than 100 pounds of refrigerant.

(b) When two or more multiple systems are installed in a single building, each such system shall be independent of the others and placed so as to be as remote from the others as the structural features of the premises will permit.

It is recommended that the authority enforcing these regulations be consulted before the installation is made.

5. Refrigerant Lines.

Refrigerant lines may be as follows:

(a) Standard pipe or approved seamless tubing of standard pipe sizes for refrigerants requiring test pressures of 300 pounds or less, and extra heavy pipe or tubing of equal strength for test pressures in excess of this figure.

(b) Approved annealed seamless copper.

(Continued on Page 14, Column 2)

KELVINATOR MEN FROM OVERSEAS VISIT THE FACTORY AT DETROIT

During the month of August, a number of Kelvinator distributors from overseas visited the Detroit factory. E. J. C. Herring, general manager of the Jost's Engineering Co., Ltd., Bombay, India, visited the factory early in August. His organization recently secured an individual order from a prominent Indian prince for 29 all porcelain Kelvinators. Mr. Herring devoted about a week to a thorough study of commercial applications and equipment.

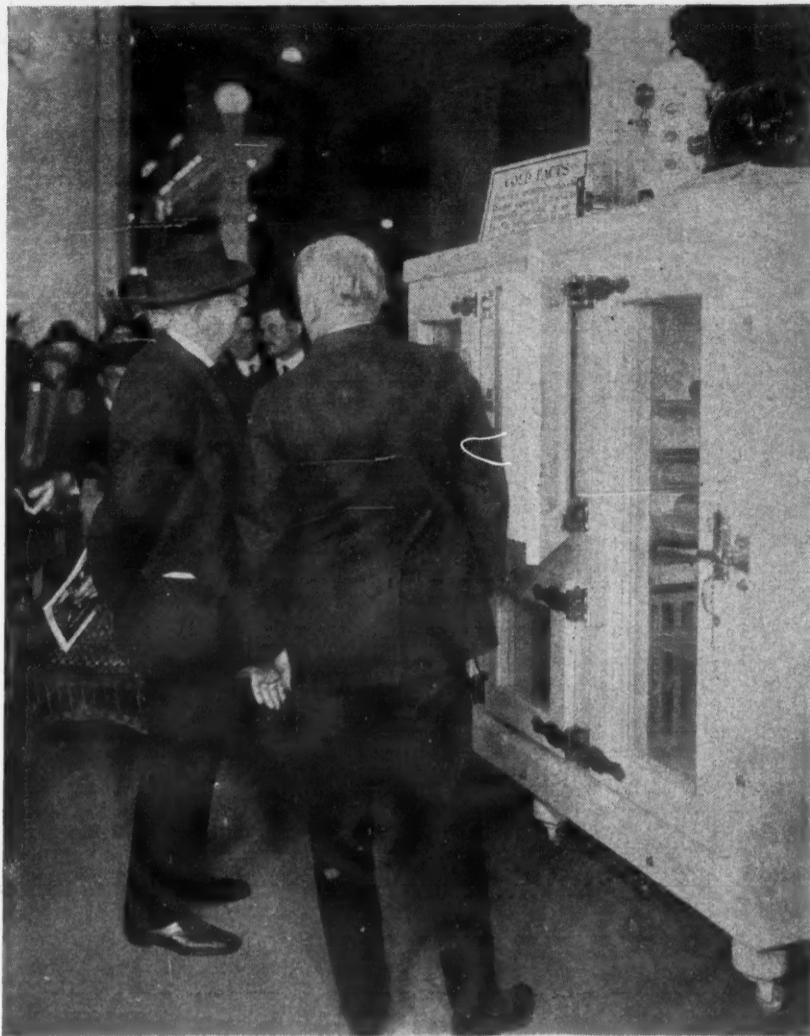
J. C. Myrick, of Panama Canal Zone, and S. B. Chapman, Queensland Machinery Co., Brisbane, Australia, were also in the factory taking training courses.

B. D. Manchester, field manager for Australasia, and F. B. Hallihan, field engineer in South America, are spending the month of August at the factory to familiarize themselves with the entire domestic and commercial Kelvinator line for 1929.

F. A. B. Peters, president of Peters American Delicacy Co., Ltd., Sydney, Australia, also spent some time at the Kelvinator factory. Mr. Peters is known as the ice cream king of Australia. He went to Australia 32 years ago from Ann Arbor, Michigan, to engage in mercantile business. Later he became interested in dairying and then in ice cream manufacturing as a side line to the dairy business. The side line has now become the business. "When I started selling ice cream," says Mr. Peters, "my friends gave me the laugh, they said the Australians didn't want ice cream or any cold delicacy. They tried to frighten me with claims that hot tea and hot drinks were all Australians wanted, but I kept on and today ice cream is the national delicacy. This year we will manufacture over a million gallons of bulk ice cream and about 275,000 gallons of package ice cream."

Mr. Peters is in this country to buy machinery for his new factory in Melbourne which will have a capacity of a millions gallons a year, and to arrange for shipments of a large stock of Nizer ice cream cabinets for his dealers.

14 Years Ago



Thomas A. Edison viewing the Williams electric refrigerator at the New York Electrical Exposition in 1914. E. T. Williams, inventor of the machine, now consulting engineer of the Servel Corp., is explaining the device to Mr. Edison. Further comment on the pioneering work of Mr. Williams will be found on Page 3.

10 COPELAND DISTRIBUTORS PRESENTED WITH LOVING CUPS

Ten loving cups have been awarded by Copeland Products, Inc., Detroit, to the winners of the five-weeks' distributors' championship contest conducted from July 15 to August 18. The following distributors won trophies in their classes: Class A—Copeland California Sales Co., Los Angeles; Class B—Beaudette & Graham Co., Boston, Mass.; Class C—Charles Rice, Inc., Springfield, Mass.; Class D—Copeland Refrigeration Co. of Oklahoma, Oklahoma City; Class E—Copeland Refrigeration Co., Milwaukee, Wis.; Class F—Akron Copeland Co., Akron, Ohio; Class G—Good Housekeeping Shop, Youngstown, Ohio; Class H—Carloss Co., Memphis, Tenn.; Class I—Krehl & Son, Madison, Wis.; Class J—Montgomery & Crawford, Spartanburg, S. C.

LASSEN APPOINTED CHIEF ENGINEER OF ELECTRO-KOLD

Manuel Lassen, inventor of the Lassen Control, has been appointed chief engineer of Electro-Kold Corp., Spokane, Wash. He fills the vacancy left by the death of L. J. Kimmel, designer of the Electro-Kold machine.

Mr. Lassen was research engineer for Frigidaire Corp. for three years. He also did research work for the Detroit Creamery in 1922-23. In 1925 he was chief engineer for Copeland and in 1926 was chief of the general engineering division of Servel Corp., New York City.

SEVENTY ZEROZONE CABINETS IN NEW CHICAGO APARTMENT

The Iron Mountain Co., 939 E. 95th St., Chicago, manufacturers of Zerozone electric refrigeration, report the installation of Zerozone compressors and cabinets in the Ingleside Court apartments. The building, valued at \$380,000.00, located on Chicago's South Shore, required the installation of seventy model LE-49 Zerozone cabinets and four model I air cooled compressors.

Each compressor is mounted on a solid concrete base with ample wall space. With the remote installation, a compartment is left in the bottom of each cabinet which provides for the storage of vegetables. In a letter to the Iron Mountain Co., the owners say:

"Since starting this installation, we have had very few removals and no vacancies for any length of time. These facts speak for themselves as to the value of Zerozone to an apartment owner."

IROQUOIS CO. QUILTS BLAMES HIGH COSTS SHARP COMPETITION

Business to Terminate Dec. 31

Iroquois Electric Refrigeration Co., Philadelphia, Pa., subsidiary of the Barber Asphalt Co., announced on August 28 that business of the company will be terminated on December 31, 1928. It will dispose of its electric refrigeration interest to the best advantage.

The announcement states that the relinquishment of this undertaking is due to the conviction that the high costs and low competitive selling prices prevailing in the industry do not indicate early and satisfactory returns, and even ultimate financial success is not so close at hand to justify the company in prolonging its efforts in this direction. The Iroquois machine has been on the market since 1926.

GEORGIA POWER REPORTS 31 PER CENT QUOTA ON THIRD DAY OF DRIVE

\$63,848.55 sales in five days or 31.9 per cent of quota was the Sept. 8 standing of the Georgia Power Co. fall drive on General Electric refrigerators.

A quota of \$200,000 or \$6,896 per day has been set for the drive which opened Sept. 4 and will close Oct. 6.

Greensboro won the \$25.00 prize offered to the district selling the greatest percentage of its quota on the first day. This district sold 137 per cent with Vidalia coming second with 131 per cent and Brunswick 88 per cent on the first day.

The Alexander-Sewald Co., Atlanta, General Electric distributor, is co-operating with the Georgia Power Co. in the drive.

Electric Refrigerator Service Company Organized in Boston

Several men recently connected with the servicing of a number of different makes of electric refrigerators have formed an electric refrigerator service company operating under the name of Miller, Sedgewick & Co., 884 Main St., Cambridge, Mass.

The company advertises to service Servel, Coldak, Zerozone, Absopure and Iceberg electric refrigerators in both domestic and commercial types.

WINNERS IN DETROIT CONTEST ENTERTAINED BY WOODBRIDGE

C. King Woodbridge, president, Kelvinator Corp., Detroit, recently entertained the winners of the Dalrymple-Kelvinator Co., Detroit, Better Way Track Contest, at lunch at the Kelvinator factory, and personally presented them with prizes. D. P. Dalrymple, president, Howard Barber, sales manager, and R. W. Walker, manager of the Dalrymple builders' department, were also present. The winners were A. E. Talsman, high man, H. Vogel, G. E. Van Auker and H. W. Willson.

The Better Way Track contest consisted of the Leadership Stakes participated in by every member of the Dalrymple-Kelvinator organization. This race was followed by the Dependability Stakes, the Quality Stakes and finally the President's Grand Derby, each race covering two weeks. The two leaders in each of the departments in the company were eligible to participate in the Grand Derby.

A Better Way Track Dope Sheet published every week, betting on the "horses" by every member of the organization from office boy up, and frequent posting of positions in the races kept the interest in the contest at a high pitch among all members of the Dalrymple organization.

200 FRIGIDAIRE MEN ATTEND SALES CONVENTION AT OAKLAND

More than 200 branch managers, salesmen and dealers representing the Frigidaire Corp. in northern California and Nevada attended the district sales convention held on August 18 at the Hotel Oakland, Oakland, Calif. The meeting was one of a number held to introduce the 1929 model Frigidaire.

C. J. McIntyre, Pacific coast regional manager, presided at the meeting and luncheon. Other speakers were J. K. Knighton, zone manager for Oakland, San Francisco and Los Angeles territory; C. G. Stern, zone manager for Washington and Oregon; P. J. McInerney, of the commercial education department of the Frigidaire Corp., and E. Melke, zone manager for the Sacramento, Stockton, Fresno and San Jose.

FILTRINE COMPANY SELLS FORTY WATER COOLERS

The Filtrine Co., 53 Lexington Avenue, Brooklyn, manufacturers of coolers and filters for use with electric refrigeration machines has just completed the installation of forty water coolers in the new Chase Bank Building, New York City. Graham, Anderson, Probst & White, architects.

The Chase National Bank is one of the largest banking institutions in the world and their new building, into which they have just moved, embodies the very latest improvements of every description. Portable self contained units were installed. This constitutes the largest single order for an office building ever sold in New York City.

BINDERS FOR THE NEWS

A number of subscribers have inquired regarding binders for file copies of ELECTRIC REFRIGERATION NEWS. To meet this demand a quantity of binders have been ordered which will be delivered within a few days. Those desiring binders are therefore invited to send in their orders at once.

Twentypes will be available. One has a spring in the binding edge and it is only necessary to open the binder, pressing the backs together, to insert new issues or remove those already in place. This type of binder always looks neat whether it contains one issue or twenty-six.

The other type, known as a multiple binder, has twenty-six metal strips in the binding edge, one for each issue of the year. A metal strip must be removed and replaced each time a copy is inserted. It is a little more trouble to operate than the spring binder, but it has certain advantages, namely, that none of the type matter is obscured and it is less likely that copies will be removed.

Both of the binders have stiff covers and are attractively bound in a good quality of black imitation leather with the name "Electric Refrigeration News" stamped in gold on the front cover. A binder of either type will be shipped postpaid on receipt of \$3.75. Please specify whether you want the spring back or multiple type.

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CAMP REFRIGERATION HELD BY G. E. MEN AT ASSOCIATION ISLAND

Distributors Plan and Play with Office and Factory Officials.

CAMP Refrigeration II—four days equally divided between serious business sessions and outdoor sports—provided a meeting ground for General Electric refrigerator distributors and representatives of the company's Electric Refrigeration Department at Association Island, Sept. 4-7. Two hundred and fifty were present, the housing capacity of the Island. An impressive ceremony attended the flag raising which marked the opening of the camp, following the traditional procedure of the many "camps" which have been held at Association Island.

Mornings were devoted to business sessions, afternoons to athletic events and evenings to elaborately staged and costumed entertainments. P. B. Zimmerman was chairman of the business sessions, J. J. Kehoe was chairman of sports, and A. C. Mayer, chairman of the show committee, and H. C. Mealey, camp manager. W. E. Underwood, of Lord & Thomas and Logan, advertising agency, was author and director of two plays, one a serious presentation of home office activity, and the other a facetious melodrama entitled "Guilty or Not Guilty," presented at the Town Hall Theatre.

J. O. Morris, of Albany, N. Y., was captain of the handsomely-uniformed "Royal Northwestern Mounted Police," which took the responsibility for maintaining order during the off hours. A. L. McCormick, of Detroit, presided as Grand Itok of the Igloo, which opened promptly on the stroke of twelve each night. W. D. Alexander, Jr., of Atlanta, Ga., led the opening parade as Grand Marshal. M. F. Mahony, of Albany, New York, and J. J. Donovan, of Cleveland, were ring masters at the circus staged Thursday evening. A. S. Dunning, of Duluth, and L. J. Spiers, of Greenville, S. C., provided continuous entertainment during intermissions. A twelve piece band furnished music for all occasions.

Distributors having leading parts in the theatrical events arrived early for rehearsals, while the balance of the campers were transported by a special train run from Cleveland to Sacketts Harbor, and by special cars from New York City. Western and southern distributors met in Cleveland on Labor Day. The General Electric offices were kept open all day to receive the visitors.

(Continued on Page 11, Column 1)

BOSTON MUSIC STORE HOLDS OPENING FOR SERVEL—ELECTROLUX

After fifty-five years in a business devoted to pianos, talking machines and radios, the C. C. Harvey Co., Boston, Mass., has added automatic refrigerators to its line, becoming distributor for Electrolux and Servel in Boston and vicinity. Following the renovating and redecorating of a large section of its showrooms at 144 Boylston St., a formal opening was held Monday, September 10.

Confidence in the soundness of its venture was manifested by an initial order for three carloads of merchandise and the leasing of a warehouse and service station adjacent to the Harvey Company's four-story building. Officers of the organization say that the addition to their business was motivated, not by a decline in the sale of pianos, talking machines or radios, nor the anticipation of such, but by the fact that automatic refrigerators fit perfectly into their methods of merchandising.

"Our expansion into the refrigeration field is logical," said E. A. Cressey, general manager. "In more ways than one the music and refrigeration business parallel each other. Each is sold by the 'lead and follow-up' method. In a great majority of instances payments are made over long terms. Each requires a certain amount of servicing. Refrigerators can be displayed in the same showrooms and windows that are used for pianos and talking machines.

"And fifty-five years in business have given us thousands of contacts. These purchasers of pianos, radios and talking machines are potential automatic refrigerator users. They appreciate and want the modern and good things of life, and they have the money to buy them.

"While it has been necessary for us to augment our selling organization with men competent to install and service the Servel and Electrolux refrigerators, the actual selling organization finds its nucleus in the Harvey force that has been selling pianos, talking machines and radios."

576974

"Patents Are a Mere Lottery"—David Boyle

Oliver H. Castle Co.,
76 E. Georgia St.
Indianapolis, Ind.

OFFICE OF
DAVID BOYLE,
PATENTEE AND MANUFACTURER OF THE—

Boyle Ice Machine & Refrigerating Apparatus

—FOR—
BREWERS, PACKERS, DISTILLERS, ETC.,
521 West Monroe Street.

CHICAGO, ILL., Feb 10th 1886

Your valued favor of 6th inst. received and considered. It seems almost to claim one third more production of ice in a machine without any more cost, by any change in the freezing chamber or cans. It is equally almost perhaps to judge of a subject without knowing fully about it, neither can I with fully informed judge of the pecuniary value of your invention. I trust you do not think there is millions in it. Now as I cannot get a copy of your patent I will be pleased to give you my ideas about its utility & value. Patents are a mere lottery, the most deserving seldom reap much profit. Yours sincerely
David Boyle

Original letter by David Boyle, pioneer in the development of the ammonia compression machine for ice making, contributed by O. H. Castle, of the Castle Refrigerating and Machine Co., Indianapolis, Ind.

O. H. CASTLE RECALLS FIRST EXPERIMENTS WITH REFRIGERATION

IN response to the News' request for historical data on the development of the refrigeration industry, O. H. Castle, of the Castle Refrigerating and Machine Co., Indianapolis, Ind., outlines the high spots as he remembers them in his years of contact with the industry. According to Mr. Castle it was in 1878 that Geo. Stockman constructed an ice machine patterned after a machine of the Carré type of 10 ton capacity which had been imported from France around 1862 and which was at that time in use in New Orleans.

The machine which Mr. Stockman constructed operated fairly well but improvements were continually made. The ammonia valves for the early machines were manufactured by Mr. Castle in 1878-79-80. Mr. Castle then began to experiment with various types of machines, one of which produced 60 lbs. of ice without using water on the absorber.

In 1900 a machine was built, the proportions of which were taken from a small experimental plant and on completion under test it produced 8.06 tons of ice per ton of coal which at that time was far above average. This machine, like the previous one, did not use water on the absorber which was four feet in diameter and twelve feet high, containing 10,000 square feet of unpainted fly screen wire. The weak cooled liquor was held in the meshes of the wire and the incoming ammonia gas from the ice tank coils was immediately absorbed thereby producing a rich liquor of 130 degrees temperature. This was then cooled and used again.

On March 23, 1886, Patent No. 338,482 on an absorption ice machine was issued to Mr. Castle. A number of other patents on ice machines and parts have since been issued to him.

The longhand letter reproduced on this page is signed by David Boyle who, according to Mr. Castle, first advocated and used ammonia gas for cooling and ice making. Records show that in 1869 Mr. Boyle built two small experimental ice machines both of which were considered failures. In 1872 he took out patents on improvements on ice making machinery and apparatus, his first patent being issued June 25, 1872. In 1873 he went to Jefferson, Tex., with a one ton ice machine which he had constructed in New Orleans

after months of toil. He succeeded in erecting and getting the plant into successful operation.

From 1875 to 1878, he was associated with W. B. Bushnell of Quincy, Ill., building ice making and refrigerating apparatus at Crane's shop in Chicago. Much of this equipment was shipped to Texas, notably a plant for the U. S. Quartermaster's Dept. at San Antonio. During that period the company was known as Boyle & Bushnell.

In 1878 the Boyle Ice Machine Co. was incorporated in Chicago and that company built a large number of machines. In 1884 Mr. Boyle withdrew and the remaining interests were consolidated with those of the Empire Ice Machine Co., St. Louis, to form the Consolidated Ice Machine Co., which in 1890 went out of business. The interests of this company were purchased by John Featherstone Sons Co., Chicago. Mr. Boyle continued to manufacture ice machinery on his own account till his death. It is said that Mr. Boyle did more perhaps than any other man in the U. S. to develop the compression ammonia system of refrigerating machinery.

In 1901 the Castle Refrigerating Machine Co., erected at Seymour, Ind., a fifteen ton ice plant. This plant was to be operated by a compression gas engineer. Mr. Castle relates that this man wanted to pump out the coils of the ice tank for some reason and failed. He then made a bet with the manager that it could not be done. Mr. Castle was called in and upon proper operation of the valves a vacuum of five below was reached.

Mr. Castle explains that engineers understood air and gas compression and they being in the majority induced the re-

frigeration men to change to the compression machine which the Castle Refrigerating Machine Co. has been making in commercial sizes for twenty-seven years.

LEONARD OBTAINS FIRST CABINET PATENT IN 1882

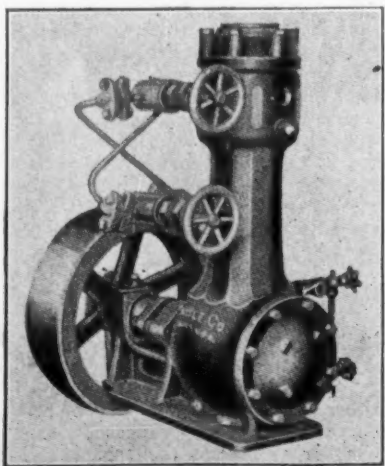
The old-time refrigerator was a "top-icer." It had irremovable flues, and in case anything spilled into the flues that was well-nigh irremovable, too. A refrigerator of this kind was in service in the home of Charles H. Leonard, of Grand Rapids, Michigan, back in 1880. One day a maid in the Leonard home sought to cool a pail of hot lard by setting it on the ice in the refrigerator. The ice had been packed unevenly, and when it began to melt under the heat of the lard the pail tipped sideways and spilled some of the lard down the flue. When Mr. Leonard was told of the happening he agreed to clean the refrigerator. He found it was practically impossible to scrape the lard out of the narrow space between the lining and the outside wall of the cabinet.

"That's no way to make a refrigerator," he said. "There should be some way to build it so that every part could be easily cleanable." And then and there was born the idea of the Leonard Cleanable Refrigerator.

It was in 1882 that a patent was granted to Charles H. Leonard, based on his idea of building refrigerators with removable slides in the ice chamber. Then it was that Mr. Leonard decided to embark in the business of manufacturing refrigerators. First he "let out" the various jobs to contractors. One firm made the cabinets, another the linings; the "assembling" was done in a small storeroom.

Within a year, encouraged by his success, he rented a small shop on Canal Street, the second floor of the building where, on the first floor M. R. Bissell was floating the Bissell Carpet Sweeper Co. Before the end of the first year the place was destroyed by fire and the Leonard Refrigerator Co. was wiped out.

However, Mr. Leonard was sure there was a market for cleanable refrigerators, so he rented a plant on Pleasant Street and started again. In 1888 the company moved into its own six-story factory building in downtown Grand Rapids, and in 1894 a seven-story structure was added. And still later another seven-story building was added. These buildings were occupied until 1908, when the company moved to its present location adjoining Clyde Park and Grandville Avenues.



The Castle Machine

Frigidaire Men See New Model at New Orleans Meeting

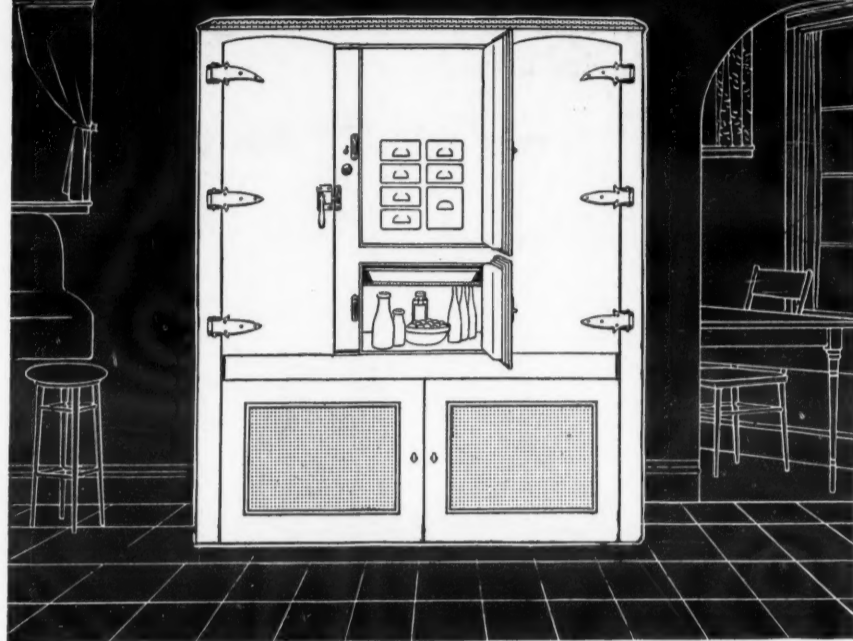
Seventy-five members of the New Orleans Frigidaire sales staff attended a meeting and banquet held at the Bienville Hotel, New Orleans, La., on August 22 to celebrate the introduction of the new

Frigidaire models. Plans for the future were discussed by the various speakers at the meeting. C. E. Russell, zone manager, and H. G. Hosch, of the branch operating division, both of Dayton, O., and P. K. Irby, regional manager of the southwestern division, conducted the meeting.

FOR THOSE WHO WANT THE FINEST

Copeland

DEPENDABLE ELECTRIC REFRIGERATION



The Appeal of Quality

By manufacturing products that have appealed to those who want the finest, Copeland has achieved an enviable reputation in the field of electric refrigeration. ☞☞

This quality is not only present in the magnificent new all-porcelain, electrically lighted Color-DeLuxe models—it extends throughout the entire Copeland line, even to the models which are priced as low as \$195 at factory.

It is present, too, in Copeland separate units for ice boxes, Copeland water coolers for offices and factories, Copeland multiple installations for apartments, and Copeland commercial refrigeration units. ☞☞ All models of Copeland electric refrigerators for the home

have one or more double-depth dessert drawers, no drain pipe, cold tray for chilling foods or crisping salads, excess refrigerating capacity. All models make more ice

cubes than comparable units of other manufacture: minimum number of cubes is 105; maximum, 378 cubes or 24.5 pounds of ice at one freezing. All models are

powerful freezers (standard size condensing unit for ordinary household use is capable of refrigerating up to

40 cubic feet, even with a single cylinder compressor and a one-sixth h. p. electric motor) yet they are quiet, dependable and economical in operation. They sell

readily and seldom require more than one demonstration. ☞☞ Copeland sales during first six months of 1928 were practically double the same period

during 1927. July shipments 120 per cent greater than last year. To meet increasing demand Copeland has

just added a new factory, doubling manufacturing facilities. ☞☞ Copeland dealers generally are making large and increasing returns from their franchises. Territories are still open for those who can qualify.

COPELAND, 630 LYCASTE AVENUE, DETROIT, MICHIGAN

MAIL THIS COUPON

Copeland, 630 Lycaete Ave., Detroit, Michigan ERN 9-5

I am interested in learning more about the Copeland franchise.

Name _____

Address _____ State _____

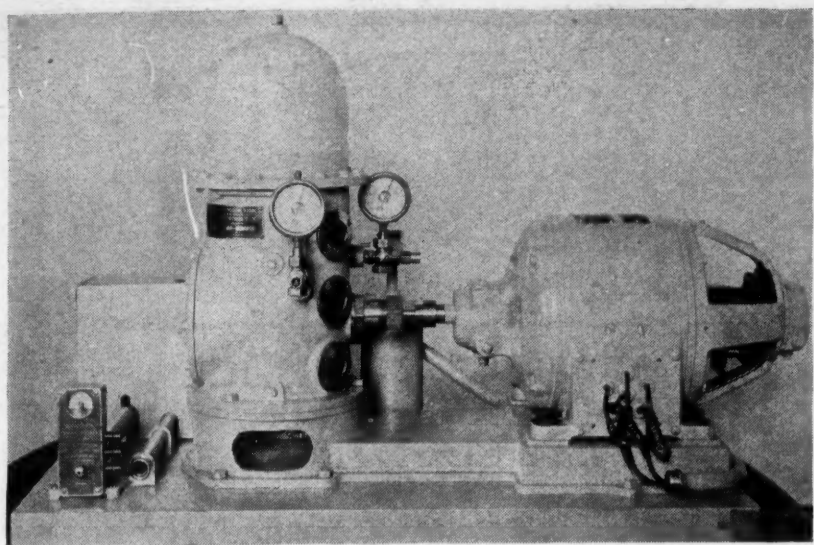


Photo A—Williams machine approved by Navy in 1919

Inventions of E. T. Williams Big Factor in Growth of Domestic Refrigeration

THE work of E. T. Williams in the domestic and small size commercial refrigeration fields, which have now been made the subject of mass production, may truly be classed as pioneer. Of particular interest in the domestic line is his self-contained refrigerator shown in Photo B below which was exhibited at the Electrical Exposition in New York in 1914. This machine was of the rotary compressor type, water-cooled, using ethyl chloride as a refrigerant and glycerine as a lubricant. The machine was designed to have ample capacity and it may be seen from the photograph that it was of generous size. The condenser is in the dome on the upper part of the machine. At 1800 R. P. M. the machine developed about six hundred pounds of refrigeration. The construction of the condenser is shown in the drawing taken from U. S. patent 1,165,926. The system was of the dry type and the evaporator was partly submerged in the brine tank. About 15 lbs. of ice could be made at one time in moulds immersed in the brine.

This machine was manufactured by Westerberg and Williams, engineering contractors, who specialized in automatic machinery and particularly new development and problems in automatic refrigeration. The history of this firm is interesting in considering the development of domestic and small size commercial refrigeration. At the time this firm was formed, Charles Westerberg was one of the principal owners of the Singer Co., then a well-known manufacturer of refrigerating systems. The firm Westerberg and Williams was formed in 1901 to become selling agents of the Singer machine.

In the latter part of 1902, Fred Kimball,

then manager of the fractional H. P. motors division of the General Electric Co., proposed the combine of four leading manufacturers of refrigerating systems including the Singer Co. The other companies were the Marshall Co., the Dunham Co. and the Ballantine-Cleveland Co. As a result, the Federal Automatic Refrigerating Co. was formed for the purpose of manufacturing complete automatic refrigerating machines of from 1/2 ton to 20 tons capacity. Westerberg and Williams spent some two years assisting in the development of machines for the newly formed company, designed around some seventy patents which became pooled by the joining of these four companies. The Federal Automatic Refrigerating Co. went through a series of changes and culminated in the well-known Automatic Refrigerating Co. of Hartford.

In 1902, Westerberg and Williams equipped a soda fountain in the City Hall Pharmacy in New York City with a two-ton complete automatic Singer refrigerating machine. The owner of the drug store wanted an equipment which would enable him to draw frappe carbonated drinks directly from taps. This was accomplished by maintaining the carbonated water with-

in a two degree temperature range between 28 and 30 degree F. The fountain was made up of five sections and was probably the largest of its day. The carbonated water was carried in block tin coils immersed in glycerine "brine" at 150 lbs. pressure. On release of pressure at the draft taps, a portion of the carbonated water immediately formed into ice crystals. This system operated successfully until, one day, the sulphur dioxide escaped from the receiver of the system into the building, driving the occupants into the street. This led to the abandonment of this plant.

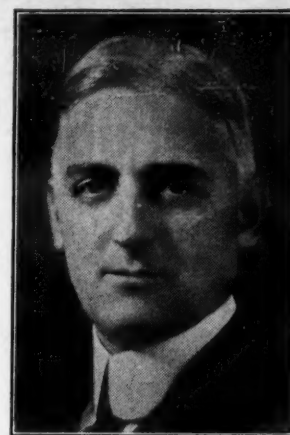
When the new machine was designed by the Federal Automatic Refrigerating Co., it was prompted by experience of this nature to adopt ammonia as a refrigerant rather than sulphur dioxide.

About 1910, there was a considerable public demand for domestic refrigeration. Electric public utility officials realized the opportunities in this field and it was at the request of such officials that Mr. Williams, on returning in 1912 from a European trip on which he had made a survey of refrigeration in the meat industry for the Kingdom of Spain, seriously took up the design of a small size self-contained domestic unit resulting in the machine shown in photograph A. At that time there was no data available on the physical properties of ethyl chloride and Mr. Williams had to prepare such data himself.

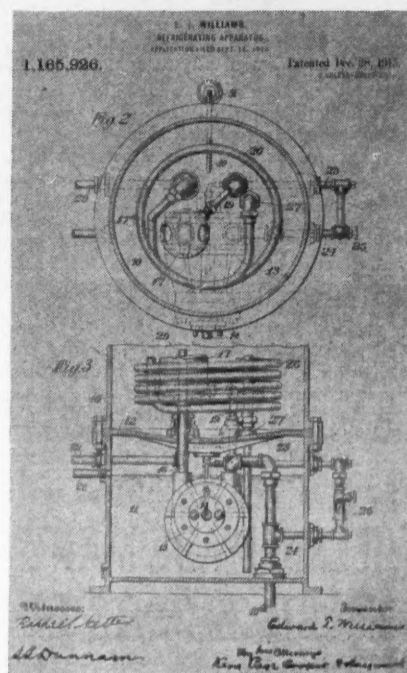
In the photograph reproduced on page one is shown a later model of the Williams' refrigerator. Mr. Williams is shown in the foreground discussing the machine with Thomas A. Edison.

In 1918 and 1919, the Williams' machine was tested by the Navy Department. The test ran over a period of eight months. The machine was officially approved for naval use in 1919 and was used to some extent by the Navy. Photograph A shows the machine tested and approved by the Navy.

These machines, including an air-cooled model, were manufactured by Westerberg and Williams and its successor in business,



E. T. Williams



the Electrical Refrigerating Co., until about 1924. At this time, Mr. Williams visited the Good Housekeeping Institute in Detroit and saw the Servel machine which had been invented by James H. Dennedy in 1920. Mr. Williams prophesied that this machine would be heard from and urged his associates to take on the agency for New York and vicinity for the Servel machine. This they did and in 1925 the Servel Corp. of New York was formed of which Mr. Williams was made president. This company took over the selling contract held by the Electrical Refrigerating Co.

Since that time, Mr. Williams has been actively engaged in refrigerating problems, principally as consulting engineer for Servel, Inc.

Among other developments of Mr. Williams' are the bellows type shaft seal used on his machine more than ten years ago; a magnetic coupling incorporated in a machine eliminating shaft seals (Pat. No. 1,568,305); and a solenoid compressor (Pat. No. Re. 16,693).

Mr. Williams gives the fullest measure of credit in the development of these refrigerators to H. T. Bernhard, Frank S. Dix and Frank D. Peltier. He points out that these men gave their untiring efforts for many years in solving the numerous problems encountered in the early research and design period and classes them as pioneers in this field. Mr. Bernhard was co-inventor with Mr. Williams of the multiple flooded system arrangement disclosed in U. S. Patent No. 1,050,894 which describes the use of automatic valve mechanism at the evaporator outlet to maintain different evaporators at different temperatures.

Mr. Bernhard is now with the Combustion Engineering Corp. Mr. Peltier is Research and Designing Engineer for Servel, Inc. Mr. Williams also gives great credit to his partner, Mr. Westerberg, for his steady and encouraging assistance through a period in the development of domestic refrigeration when little had been done and the future indicated many difficulties to be overcome.

Your MILLION DOLLAR SALESMAN

THERE'S a high priced salesman—a million dollar a year man helping every distributor and every dealer, for General Electric Refrigerators. His name is nation-wide advertising. He makes 23,000,000 calls a month in the form of colorful, full page advertisements in nearly all the leading magazines that go into representative American houses. There are 18 different advertisements a month or an average of nearly four magazines containing General Electric advertisements in every family making an income tax return.

That's the tremendous advertising force which is helping every distributor and dealer handling the General Electric Refrigerator to maintain record-breaking sales.

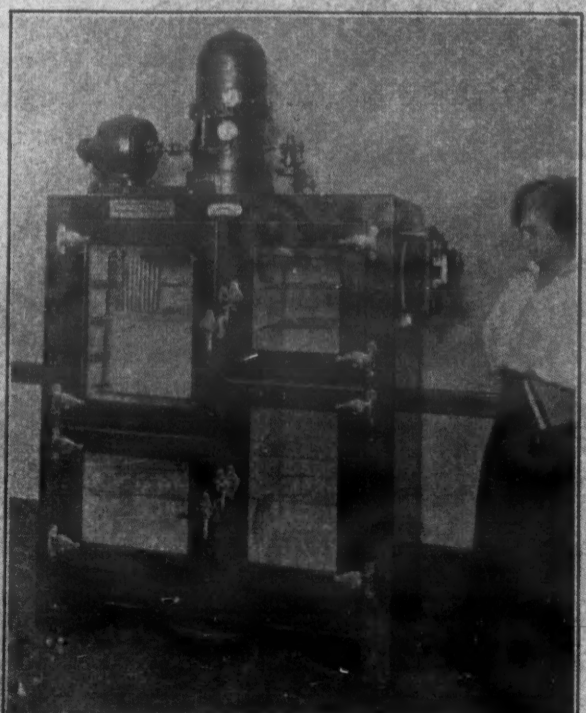
GENERAL ELECTRIC Refrigerator

"Makes it safe to be hungry"

BULLETIN No. 20

WESTERBERG & WILLIAMS
ENGINEERING CONTRACTORS
WOOLWORTH BUILDING, NEW YORK CITY

For Distribution at 1914 Electrical Exposition



Automatic Household Refrigerator
(Patent Applied For)

Photo B—Bulletin distributed at N. Y. Exposition in 1914

A Brief Outline of the Growth of American Refrigeration Publicity

By Charles H. Herter, Refrigerating Engineer, New York City
Formerly Editor of Refrigerating World

ELECTRIC REFRIGERATION NEWS is now just two years old. It is "the business newspaper of the electric refrigeration industry." It is young in this field and original in methods. This being its second anniversary, one may be permitted to look back to the time when ice and refrigerating were first treated exclusively in a journal in this country.

The writer connected with the refrigerating machine business in New York in 1889. At that time the only periodical devoted to ice was the *Ice Trade Journal*, published monthly at Philadelphia, probably by The Knickerbocker Ice Co., later known as the American Ice Co. In size it resembled the *ELECTRIC REFRIGERATION NEWS*. It treated mostly of the activities in the natural ice field. Presumably it started in 1876 or 1878.

Breweries and meat packing establishments commenced in 1880 to adopt mechanical refrigeration in units of 50 to 100 tons ice melting effect per 24 hours, all these machines being operated by direct connected steam engines.

Distilled water ice making started about 1885. By 1890 ice plants of 50 to 100 tons capacity per day were being called for. In 1891 machines of 500 tons refrigerating capacity were being installed.

By this time the industry had become sufficiently large to justify the launching of the first high class refrigerating trade journal *Ice and Refrigeration* in Chicago, first by H. S. Rich & Co., then by Nickerson & Collins Co., the present publishers, who are now in their thirty-seventh year and deserve much credit for furthering the progress and growth of an ever widening field.

The only scientific refrigerating treatise that existed in English at the time was a little 190 page booklet entitled "Ice-Making Machines," by M. Ledoux, translated from the French by D. S. Jacobus (still living) and two other professors of Stevens Institute of Technology, Hoboken, N. J., in 1892, still published as No. 46 by Van Nostrand Co., New York. This booklet helped to acquaint American refrigerating engineers with the thermodynamic laws governing the action of refrigerating vapors.

In due time a demand arose for a textbook that would supply to technical engineers data pertaining to the construction and operation of ice making and refrigerating machines and their applications in various industries. To satisfy this demand the publishers just mentioned issued in about 1897 the "Compend of Mechanical Refrigeration" written by Dr. J. E. Siebel, which handy 450 page volume has passed through many editions. Today, of course, the field has grown so complex and practice is continually changing, so that no one book can be expected to portray more than a definite portion of the vast field before us.

In 1904 Nickerson & Collins started publishing each two years "The Ice & Refrigeration Blue Book and Buyers' Guide," cataloging every installation and application of ice making and refrigerating machine in the entire United States. This contains very valuable statistics showing distinctly the enormous growth and diversity of the refrigerating industry.

By 1898 the *Ice Trade Journal* reappeared as *Cold Storage*, in New York. Ten years later its name became *Cold Storage & Ice Trade Journal* and in another ten years it became *Refrigerating World* which undertakes to cover the whole wide field monthly and is now in its sixty-third volume.

In 1905 was formed in New York "The American Society of Refrigerating Engineers," a body of engineers which includes now about one thousand members of different grades. For a number of years their proceedings were published in the form of an annual volume. After 1920 there were six bi-monthly journals published per year and since 1922 we have *Refrigerating Engineers*, a scientific monthly published by the Society and available to any subscriber.

Another monthly magazine helping to spread the gospel of cold is *Refrigeration* (formerly *Ice*) of Atlanta, Ga.

These papers, besides *ELECTRIC REFRIG-*

ERATION NEWS, devote their energies exclusively to this business, but there are quite a number of power plant, heating and ventilating journals and other mediums endeavoring to keep their readers informed of the great progress being made daily in the wide application of refrigeration. There must also be about two dozen books available, hence the day should approach soon when every human being will know what refrigeration is and how big a factor it is in adding to the health and happiness of humanity.

ELECTRIC REFRIGERATION NEWS is issued twenty-six times a year, it covers only one branch of mechanical refrigeration, but it covers that quite thoroughly and there is a great deal still unsaid on its own subject. Hence let the two-year old grow up to manhood and all interested will profit.

WILLSIE MADE MANY IMPROVEMENTS IN ABSORPTION UNITS

By A. C. Silwell

YOUR record of pioneer efforts for domestic refrigeration would not be complete, we think, without mention of the work of H. E. Willsie. Patent attorneys say that he laid the foundation for the intermittent absorption machine that will prove practical for household refrigeration.

Beginning in 1908 by building in a California desert a refrigeration machine heated by the sun's rays, which there reach a temperature under glass of over 250°, Mr. Willsie next invented the liquid seal interposed between the evaporator and the absorber to direct the flow of returning gas below the level of the liquid in the absorber. This device is now in common use and makes possible a valveless machine. For this seal he first used liquid in the evaporator but preferred a trap between the still-absorber and the evaporator.

Then he added the cooling loop which enables the returning gas to function as a pump to circulate the hot liquor of the still through the cooling water or air. The practical results of this device is almost continuous refrigeration, the elapsed time from heat off to frost being around ten minutes, and the refrigerating coils merely heating enough to defrost.

Thinking that a freezing temperature in the family ice box was undesirable, Mr. Willsie interposed an ice pan between the evaporator and the food chamber. In his early machines as much as fifty pounds of ice was there frozen. Owing to this heat flywheel temperatures in all parts of the food chamber ran very uniformly between 40° and 45° without mechanical control.

He is credited with claims for operative automatic drains without which valveless aqua ammonia intermittent absorption machines cannot long function. His drain returns water from the evaporator in a way that even a "boil over" is not noticed by the user of the machine.

The Patent Office credits him with a new refrigeration cycle, that of sending the gas from the still through the evaporator to the condenser. This in combination with his blind end condenser, makes possible a basement installation of the still-absorber connected with multiple evaporators in boxes on any reasonable number of floors.

Believing that a large number of pos-

sible users lived in rural homes not supplied with gas or electricity he built an intermittent absorption machine heated by kerosene from a tank holding a week's supply.

The list includes an ice cream stirring device attached to the evaporator; a water circuit by which the heated water from the rectifier is delivered into the household hot water system; a filter that strains the foreign hydrogen gas out of the apparatus.

For more than four years a member of the Safety Code Committee of the American Society of Refrigeration Engineers he opposed the requirement of safety valves on household machines, urging that while safety valves were desirable on large units, safety valves, often leaky, would ruin the small machine industry. As a safety substitute he developed the precious metal rupture disc described by him in the transactions of the A. S. R. E. He opposed definite relief pressures being fixed by the code, reasoning that the relief pressure should instead bear a definite relation to the factor of safety of the apparatus, and that otherwise the development of the industry would be hampered by unscientific laws.

Omaha Man Takes Agency for General Electric in Council Bluffs.

Arthur D. Stone, for some time city sales manager for the General Electric refrigerator in Omaha, and Wallace Keown, have established a General Electric agency in Council Bluffs, Iowa. Lee Kynett and Miss Lucile Maxfield are also a part of the selling force.

The formal opening was held August 18. Ice cream and cold drinks were served the visitors. Several sales have been made and Mr. Stone feels he has a rich territory.

The new company is incorporated and will also sell oil burners and radio. Both newspaper advertising and direct by mail is being used in the preliminary work.

For REFRIGERATORS, ICE CREAM CABINETS, DISPLAY COUNTERS and BOXES

Dry-Zero in pliable slab form is especially designed for Refrigerators, Ice Cream Cabinets, Display Counters, Boxes and similar units. Users prefer it because of its amazing lightness, permanency and high insulation efficiency.

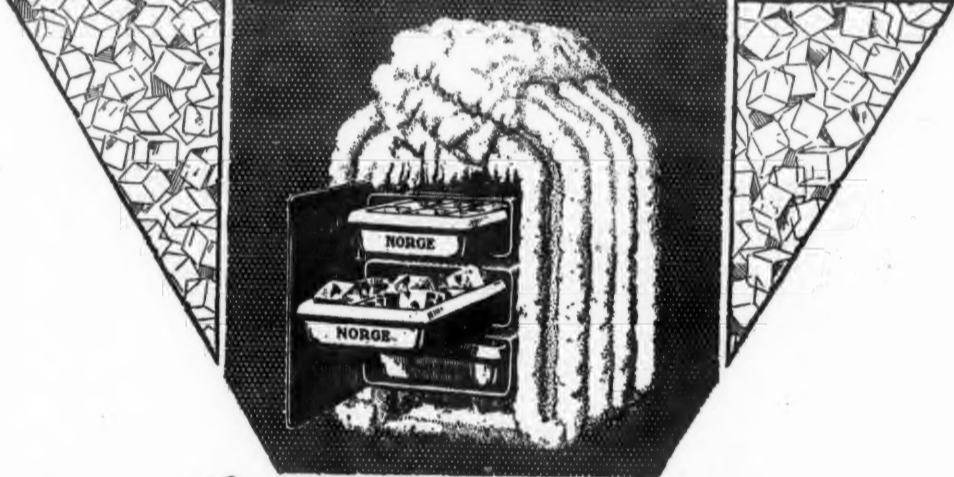
Pliable slab is a grained batt form of Dry-Zero enclosed in treated and stiffened muslin to make handling easy. It carries its own hermetic air and moisture seal. It comes in thicknesses from 1½" to 4" and is usually manufactured to sizes specified by the user. Mail coupon for details.

DRY-ZERO CORPORATION 130 N. WELLS ST. CHICAGO

Please send details and literature on Dry-Zero. (2)

Name _____ Address _____
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A SIZE FOR EVERY NEED



NORGE is **Economical** as the **Scot of Fiction**

TODAY, better housekeepers do not blindly accept the most widely advertised electric refrigerators—they think before they buy. This "thinking housewife" is the real reason for Norge's steady growth, and its arrival at quality leadership.

Permanently quiet. Constant automatic cold to guard your food and your family's health—your dependable servant always.

Delicious crisp lettuce and salads, special desserts made in the ice cube drawers, desirable temperatures for your milk and other perishables. Plenty of ice cubes, of course.

Economical as the Scot of fiction, the habit of saving you money is built into its constitution.

The Quality Leader, but—at a popular price.

NORGE CORPORATION—DETROIT

NORGE
ECONOMICAL REFRIGERATION

Excellent territory is still open for distributors who can measure up to Norge standards. Write for full particulars, or, better still, call and see us at the factory, 670 East Woodbridge St., Detroit. Norge franchise is a valuable franchise.

P E R M A N E N T L Y Q U I E T

—one piece pressed aluminum.

—securely interlocked, removable grids.

—we'll be glad to quote in any quantity.



FRANKLIN AIR COMPRESSOR CORP.
Norristown, Pa.

The Domestic Refrigerator Business 12 Years Ago

Twenty-One Compressions and Eight Absorption-Type Units on the Market or in Process of Development

Note: In the issue of November 1, 1916, *Ice and Refrigeration* published a general review of the refrigerating industry during the previous twenty-five years. Following are brief extracts from a condensed description of some of the principal household refrigerating machines that had been introduced or were being exploited by promoters at that time.

THE first machines of this nature devised were along the principle of the oldest type of refrigerating machinery, namely the vacuum machine. Of these the "Raplin," made by the Pulsometer Engineering Co., England, and the "W-K," made by the Vacuum Ice Machine Co., Odense, Denmark, are representative types. These are made for hand operation, or machine drive by belt from any convenient source of power. The refrigerating effect of these machines is based upon the well-known principle that rapid evaporation of a portion of the liquid in the vessel cools the remainder. By producing a vacuum over the water evaporation is so rapid that ice is formed in the vessel. However, in order to maintain this vacuum and obtain continuous refrigerating effect the vapor from the water must be removed as fast as formed. For this purpose sulphuric acid is employed as an absorbent, owing to its well-known affinity for water vapor. The machine, therefore, consists of a vacuum pump and sulphuric acid container and the necessary connections to the article to be cooled, etc.

The Autofrigo

Another European refrigerating machine intended for the household, using methyl chloride as the refrigerant, was introduced in Switzerland just before the outbreak of the great war in 1914. It is known as the "Autofrigo" and is manufactured by Esher Wyss & Co., Zurich, Switzerland.

Absorption Types

The next type of household refrigerating machine to be introduced was the small ammonia absorption apparatus. Of these there are a considerable number, the principal ones being:

The Auto-Vacuum Machine.
The "Bosse," New York, N. Y.
The "Acme," New York, N. Y.
The "Zicer," Cleveland, Ohio.
The "Penguin," Dubuque, Iowa.
The "Willis," Jacksonville, Fla.
The "Germania," Belleville, Ill.
The "McCurdy," Ft. Madison, Iowa.

Compression Types

More activity has been apparent in the invention of compression system machines for household use and these are represented by such types as the following:

Audiffren, France and America.
"Domelre," (Isko) Detroit.
Auto-Electric, (Blizzard) Milwaukee.
Bachman, Pittsburgh, Pa.
Brunswick Automatic, New Brunswick, N. J.
"Narco," Wapakoneta, Ohio.
Girard, Springfield, Ill.
Harris, Portland, Ore.
Hercules Electric, Indianapolis, Ind.
Williams, New York.
McCrary, Jacksonville, Fla.
Standard, Belleville, Fla.
Barsmith, Chicago.
McClellan, Chicago.
Anderson, Chicago.
Goosmann, Chicago.
Hapgood, (Montclair) New York, N. Y.
Frostmaker, Chicago.
Guardian, Detroit, Mich.
Cold Blast, (Air) Chicago, Ill.
Cold Unit, (Air) Chicago.

The Audiffren

One of the first of the household refrigerating machines of the compression type to be introduced is the "Audiffren," invented by the Abbé Audiffren, Grasse, France, and is one of the simplest or least complex of all the small refrigerating machines. The refrigerant employed is SO₂. The machine was fully described in *Ice and Refrigeration* for February, 1908, and December, 1908. In 1912 the H. W. Johns-Manville Co. started to introduce this machine in America and for a time manufactured the machine at Fort Wayne. Later the work was taken over by the Audiffren Co. of America.

The Williams

An electrically operated household refrigerating machine was exhibited at the Electrical Show in New York City in October. It is being manufactured by the Electrical Refrigerating Co., Woolworth building, New York, and is made in two sizes, one equivalent to 150 pounds ice melting capacity with 1/4 h. p. motor and one of 300 pounds capacity with 1/2 h. p. motor.

The Brunswick

A refrigerating machine suitable for the modern home is manufactured by the Brunswick Refrigerating Co., New Brunswick, N. J. The ammonia compressor is of 1/4-ton refrigerating capacity per twenty-four hours.

The Montclair

Another little compression machine, the invention of C. H. Hapgood, Boston, manufactured by the Montclair Refrigerating

Co., designed for using such refrigerants as ethyl chloride, rhigolene, cynogene, etc., is of interest.

The Narco

A small compression machine, supplied under the name "Narco," is manufactured at Wapakoneta, Ohio. The refrigerant employed is known as "Andrews Liquid," from its discoverer, F. W. Andrews, Dayton, Ohio, a chemist and inventor.

The Bachman

Another small compression machine is the invention of C. E. Bachman, Pittsburgh, Pa. The machine is made only in small units, the smallest of 250 pounds capacity, is sold for \$250 at the factory.

The Frostmaker

A radically different type of compression machine is the one introduced as the "Frostmaker," built in Chicago. The compressor has neither piston nor valve. Instead the gas, either sulphur dioxide or ammonia, is compressed by means of two rotating gears that intermesh.

The Isko

"Isko" is the name applied to a small refrigerating machine manufactured in Detroit and sold in various sections of the United States. It is the same as the "Domelre," the invention of Fred W. Wolf, Jr., Chicago, which was fully described and illustrated in *Ice and Refrigeration* for April, 1914. Sulphur dioxide is used as the refrigerant.

The Girard

This small machine, which, it is stated, will be placed upon the market shortly, is the invention of A. O. Girard, Milwaukee, Wis.

The McClellan

Another small compression machine, the McClellan, manufactured at Chicago, is being exploited. It does not differ materially from the standard types of compression machinery with thermostatic control of power and water supply for condenser.

The Barsmith

The "Barsmith" machine is the invention of H. J. Smith, while Dr. C. H. Barr is the one who prepared the refrigerant. These machines are to be manufactured, it is stated, and placed on the market in 1917. Their refrigerant is declared to be a combination of three ingredients.

The Blizzard

Another small machine is that known as the "Blizzard," manufactured in Milwaukee, Wis. This small household machine is of 500 pounds refrigerating capacity and is operated under automatic control. It is of the general compression type system design, compressor driven by 1/2 h. p. electric motor.

The Harris

A small machine intended for residence use or small stores is manufactured by the Harris Ice Machine Works, Portland, Ore.

The Anderson

A recent invention of a small household machine . . . was designed by A. P. Anderson, Chicago, refrigerating engineer, and uses ammonia as the refrigerant. Its distinctive feature is that it is all enclosed in one casting and the entire machine, including motor, may be placed within the refrigerator.

The Goosmann

A small machine, invented by J. C. Goosmann, Chicago, author of "The Carbonic Acid Industry," published by Nickerson & Collins Co., using CO₂ as the refrigerant, has recently been perfected and is to be placed on the market shortly. It is provided with automatic pressure control in the condenser as well as in the evaporator.

The Cold Unit

A new air machine termed the "Cold Unit," the invention of W. H. Cotton, Chicago, is being tried out. It consists of a small compressor running at 1100 strokes per minute, driven by a small electric motor, both mounted on top of the refrigerator. The compressor drives air into four connected tubes placed against the side of the refrigerator.

Small machines supposed to be suitable for the household have been invented and are being exploited by a number of other parties, among whom are an engineering concern in Toledo; G. C. Warriner, New

Orleans; the "Simplex," made in Belleville, Ill.; the "McCrary" machine, some of which are made at Jacksonville, Fla., and at Houston, Texas; the "Wright," invented by Edgar Wright, Brookfield, Mass.; the "Guardian," promoted by Detroit parties; the "Hercules Electric," a small machine operated with CO₂ as a refrigerant, but apparently still in the promotion stage as is also another small machine invented by James Gillespie, Youngstown, Ohio, a little compression apparatus just being introduced. A small ammonia compression machine was invented a couple of years ago by J. A. Ulmer, Porterville, Calif., and a few of them built. Another machine from the same state using "rhigolene" as the refrigerant, was announced in *Ice and Refrigeration* for August, 1916. A small machine for which it is claimed that a new principle recently developed is to be utilized, but which is apparently a modification of the ammonia absorption system, is reported from Newark, N. J., and also another utilizing the ammonia absorption system from Ft. Madison, Iowa.

Frigidaire and G. E. to Be Awarded in Portland Baking Contest

A Frigidaire and a General Electric refrigerator are among the prizes to be awarded to the winners in the electrical baking contest, which is being held September 10-15 in conjunction with the home economics show of Meier & Frank, Portland, Ore. In addition to the contest electrical appliances, including refrigerators, are displayed and demonstrated during the show.

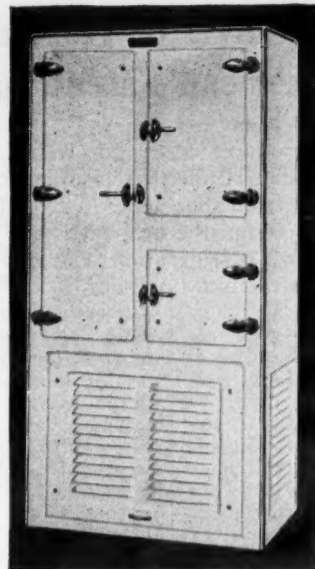
Norge Represented at Hartford

The Norge Company, of Hartford, Conn., has recently opened an establishment at 338 Pearl St., under the management of Roscoe G. Robinson and Raymond B. Thomas.

BOHN'S Latest Achievement — The New Bohn "Super Quality" Refrigerator

Beautiful, Distinctive

Can be had in 5, 6, 7, 9 and 12 cubic foot net food storage capacity.



White Porcelain Enamel inside and outside. The machine compartment is ideal for storage space where remote installation is made.

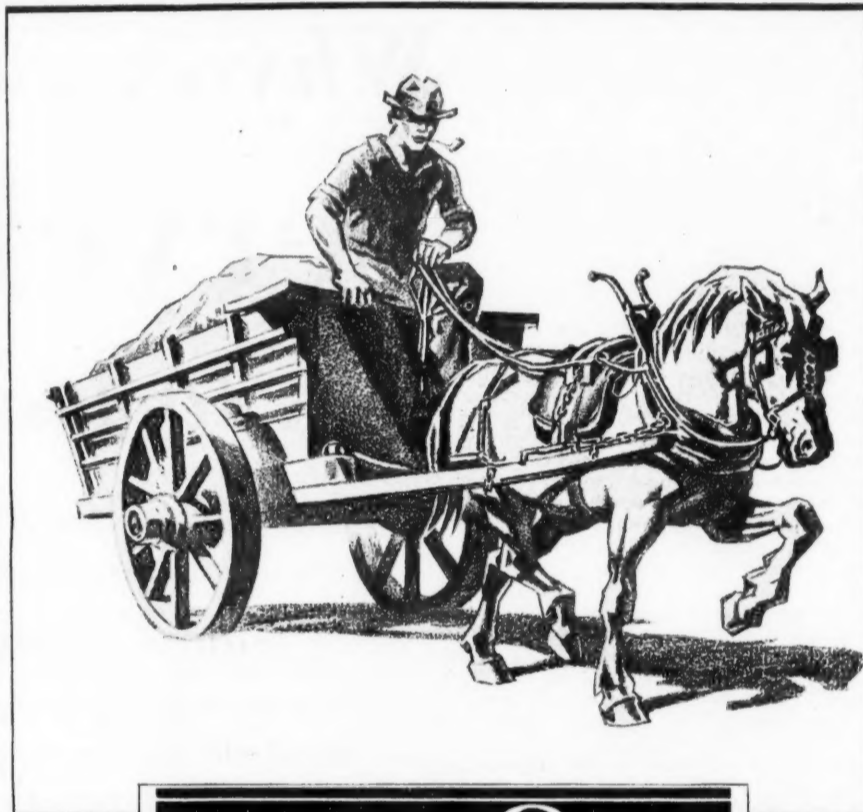
[Featuring the Insulated Baffle Wall]

The lowest prices in our 31 years of manufacturing "Super Quality" Refrigerators

BOHN REFRIGERATOR COMPANY
SAINT PAUL, MINNESOTA

These models are on display at our own stores in

NEW YORK CHICAGO BOSTON
5 East 46th Street 227 No. Michigan Blvd. 707-709 Boylston Street



WHAT IS Right WITH THIS PICTURE?

Correct: the picture follows the old adage, "place the horse before the cart". It is more than an adage. It is good advice . . . and it has a very definite application to a great many business situations. Particularly it applies to electric refrigeration, for there is a "cart" and there is a "horse" in every electric refrigerator; and in too many cases their proper order has been reversed.

In electric refrigeration there are really two systems: the electric system and the refrigeration system. They

correspond to the cart and the horse. Welsbach Low Pressure Refrigeration puts the refrigeration system first, where it belongs.

Bear in mind that there is nothing fundamentally new in the electric mechanism of a mechanical refrigerator. Minor changes only were made in adapting standard electrical devices for service in refrigeration. Where mechanical refrigeration systems vary is in the refrigerant used and the mechanism developed to make it function.

Those who express uncertainty as to

Welsbach Cabinets and equipment—Household and Commercial—
—from foundry to finished product—made in the same plant.

Welsbach Low Pressure Electric Refrigeration



Welsbach operates under only twenty pounds pressure. This load is so light, so easily carried by the simple Welsbach System that vibration, noise and wear-and-tear are practically eliminated.

dynamics. In these fields Welsbach has been a pioneer for 40 years. So, with Welsbach, the refrigeration system comes first.

The remarkable service records of Welsbach Low Pressure Refrigerators attest the fact that Welsbach Low Pressure Refrigeration is perhaps the most important single development the industry has seen in years. Refrigeration Division, Welsbach Company, 305 Ellis St., Gloucester City, New Jersey.



Welsbach Cabinets are made of one-piece seamless steel with corners and edges smoothly rounded. There are no dust-collecting crevices. The top of the cabinet, below eye level, is just the right height to serve conveniently as an unobstructive shelf space.

First Mechanical Refrigerator Invented by Cullen in 1755*

Doctor John Gorrie of Florida Obtained
First American Patent in 1850

THE first machine to produce ice by purely mechanical means was the invention of Dr. William Cullen in 1755. Thus, mechanical refrigeration may be said to date from that year. Dr. Cullen reduced the atmospheric pressure with an air pump, the evaporation of the water being so increased as to produce intense refrigeration and ice. This was the pioneer ice machine, not only of the vacuum type, but of any kind.

Some years after the invention of the vacuum ice machine, the affinity that sulphuric acid has for water was utilized by Leslie, and in 1810, he succeeded in making ice.

In 1823, Humphrey Davy and Michael Faraday (chiefly the latter), of England, demonstrated that gases could be liquefied by mechanical compression with continuous cooling apparatus to carry away the heat developed by work. Volatile freezing mixtures were also used in a vacuum.

In 1824, Vallance, of France, obtained patents in Great Britain for producing refrigeration by the use of sulphuric acid. He is said to have obtained his idea from the evaporation system used in India.

American Engineer Produced First Commercial Machine in 1834

To Jacob Perkins, an American engineer, is generally accorded the credit for inventing the first machine, which was the forerunner of the modern compression apparatus, capable of producing ice in commercial quantities. His patent was obtained in August, 1834, in England, either being the refrigerant employed. The ice machine perfected by Perkins, comprised a compressor, evaporator, condenser, and expansion or regulating valve. The evaporator containing the ether, enclosed a system of pipes through which circulated brine, the temperature of which was lowered to 5 degrees Fahrenheit.

The brine then passed into a long receptacle, containing boxes filled with water, and having frozen their contents, was pumped back to be again subjected to the refrigerating effect of the evaporating ether. Thus, the cycle was completed and the principles established upon which most modern refrigerating machines are founded. The brine, or indirect system, was thus foreshadowed. The Perkins apparatus was also constructed according to the can system of ice making, in contradistinction to the plate and the cell methods.

Prof. A. C. Twining Attains Prominence in New Field

The next person to attain prominence in the mechanical refrigeration field was Prof. A. C. Twining, of New Haven, Conn. After having worked, beginning in 1848, with sulphuric ether as a refrigerant, Prof. Twining took out a patent in England in July, 1850, and in November, 1853, the United States Patent Office issued papers to him for the same mechanism, his machine comprising a double-acting vacuum and compression pump, 8½-inch diameter and 16-inch stroke. It is claimed that he had one of his machines in operation in Cleveland, about 1855, which produced ice at the rate of 1,600 pounds every twenty-four hours. The machine was considered such a practical success that he was requested to prepare estimates for a plant in New Orleans, capable of producing eighty tons daily. Prof. Twining did so, and the total cost of the plant complete, amounted approximately to \$160,000. He estimated the daily operating cost, including all expenses, at \$146.30, or, at the rate of \$1.83 per ton. The proposed plant, however, was not built, owing to lack of financial support.

Dr. John Gorrie, of Apalachicola, Fla., to whose memory a monument has been erected in Apalachicola, by the Southern Ice Exchange, and whose statue has been erected in the Hall of Fame, at Washington, D. C., by the State of Florida, obtained the first patent granted in America for the manufacture of ice by mechanical operation. The patent was issued in May, 1851, the letters patent to run from August 22, 1850. It is said that he actually made a small quantity of ice with a model machine at a hotel in Apalachicola. Dr. Gorrie, however, died before he was able to build a large machine. His machine was later improved by Dr. Alexander Kirk and others.

Another doctor who played a prominent part in the development of the refrigerating machine was Dr. James Harrison, of Geelong, Australia, his sulphuric ether machine, brought out in 1856, being an improvement on the Perkins apparatus of 1834. He had two of his machines constructed and in operation in Sidney, and in 1860 a brewing firm in Birdigo, Victoria, installed a refrigerating apparatus of the Harrison type, which, it is claimed, was the pioneer brewing installation in the world. Dr. Harrison, at this time, commenced to experiment in the refrigeration of meat, shipping a large quantity on the sailing vessel, "Norfolk," from Melbourne to London, using artificial ice. The ice on board lasted for only three-fourths of the voyage, and the meat had to be thrown overboard.

Although Edmund Carré, of France, improved the Vallance vacuum machine, so that in the early fifties it was making ices and cooling drinks in Parisian cafes, it was his brother, Ferdinand P. E. Carré, who in 1858-60 placed upon the market a machine which gave birth to the ammonia absorption system of today. The original machine was a very crude affair, consisting merely of two vessels—one surrounded by cold water, the other containing the ammonia and water. The original patent in the United States was issued October 2, 1860, the reissue being dated February 18, 1873. The Carré machine, subsequently improved by Mognon and Rouart in France, Wass and Littmann in Germany, Reece, Mort, Nicolle and others in England and Australia, marked a great era in mechanical refrigeration. It was the Carré ammonia absorption system which really established the gigantic frozen meat trade.

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Carré Machine Shipped to Georgia During Civil War

The Carré machine was the first one to obtain a foothold in the ice making industry in the United States. The first machine was shipped through the blockade in 1863, to Augusta, Ga., by Mr. Bujac, of New Orleans. It was supposed to have a capacity of 500 pounds per day. Due, mainly, to the parties who had charge of it, the machine was not a success, and in 1866, it was shipped to Gretna, La., where it was run for exhibition and experimental purposes. Three other Carré machines, purchased by the firm of Bujac & Fiarde, New Orleans, La., and installed in that city, also proved unsuccessful in operation.

In the fall of 1865, the firm of Mepe, Holden, Montgomery & Co., purchased the first of these machines and shipped it to San Antonio, Texas, and put it in operation under the supervision of D. L. Holden. After running one season, many changes had to be made, the principal one (and the first time it was ever done) being the placing of a steam coil in the still of the machine, for the purpose of generating ammonia gas, that is, distilling off the gas from the solution. In the operation of this machine, another important discovery was made. Owing to the large amount of lime and magnesia in the water used, distillation was resorted to, and, much to the surprise of everyone, the ice came out transparent, the first transparent ice ever made by an ice machine.

The success of the Carré machine in San Antonio was followed by the installing of others. In 1868, the Louisiana Ice Manufacturing Co., at Gretna, La., erected six 10-ton Carré absorption machines, which were constructed by Sylvester Bennett, from plans furnished by Mr. Carré. The freezing tanks were made in the shape of a cross, each tank being 7x6x4 feet deep. The cans holding the water to be frozen were 2½x10x30 inches, and five blocks of ice were placed upon one another, making a block of 100 pounds. The ice was not very clear or very solid, so that the color resembled stained alabaster. The objection raised by the public caused the employment of a chemist, Dr. Joseph Albrecht, New Orleans, his advice being to boil the water before it was put into the cans, so as to drive off the air and gases it contained. Subsequently experiments lead to the use of condensed steam instead of hot water.

In 1861, Dr. Alexander Kirk invented a compressed air machine with a compression pump and hot and cold chambers. It is recorded of this machine, that it produced four pounds of ice per pound of coal. In April, 1867, Prof. P. H. Van der Weyde, of Philadelphia, Pa., obtained patent on his compression refrigerating machine.

Mr. D. L. Holden, after his successful experience in San Antonio with the Carré ammonia absorption machine, purchased the patent rights of Prof. Vander Weyde and built his first compression machine at the Novelty Iron Works in New York City. Several other compression refrigerating machines using ammonia were built and installed by Mr. Holden in New Orleans, La.; Bonham, Houston and Galveston, Texas; Mobile, Ala.; Thibodauxville, La.; Selma, Ala., and Charleston, S. C. In September, 1869, and April, 1870, and at various later dates, Mr. Holden obtained patents on his "regealed" ice making system.

In 1868, Charles Tellier, of Passy, near Paris, took out patents on his compression apparatus, whose refrigerating agent was nethylic ether and which was designed to make ice and to refrigerate air and liquids. The date of his letters patent in the United States was June 5, 1869, and one of his machines was erected in the Old Canal Brewery, New Orleans, by George Metz, with the object of producing cool, dry air, and of making ale and lager beer without the use of ice. It was designed for ether, and as ammonia was used, it was not successful and was finally discarded. However, it was the commencement of mechanical refrigeration in breweries in the United States.

In July, 1868, J. D. Postle patented a compressed air machine which was subsequently greatly improved by Bell-Coleman, Hall, Gifford, Lightfoot, and other English and Australian inventors.

In the seventies appeared the inventions of Francis D. Coppel, of New Orleans; Franz Windhausen, Germany; Prof. C. P. G. Linde, of Munich, Bavaria; Baoul P. Pictet, Geneva, Switzerland; Thos. L. Rankin, of Ohio; Martin & Beath, San Francisco; A. T. Ballentine, of Maine; James Boyle, of Texas, and David Boyle, of Chicago. Pictet's machine created widespread comment, as his refrigerant, a mixture of 97% sulphur dioxide and 3% carbon dioxide was an innovation. Among scientists, his name is also associated with the founding of the so-called "system of cooling cycles," the basis of all modern refrigeration.

Mr. David Boyle made a remarkably practical success of his inventions. He went to San Francisco in 1869, and in that year, or the year following, built two very small experimental ice machines, both of which were, to a considerable extent, failures. In 1872, he landed in Jefferson, Texas, with a one-ton ice machine which he had constructed in New Orleans, La., and after some months of toil, succeeded in erecting and getting the plant into successful operation.

See reproduction of original letter written by David Boyle in 1886 and further data regarding his activities on Page 2.

In the early part of 1876, F. M. McMillan and Silas Merchant founded the firm of F. M. McMillan & Co., in Cleveland, Ohio, for the purpose of manufacturing and selling ice machines. They employed John Enright as their supervising engineer. The machine which they proposed to build was one designed by either Merchant or McMillan, and had a single-acting compressor. No patent appears to have

been taken out for this apparatus, although previous to the organization of the Arctic Co., it was known as the Silas Merchant machine.

Senator Jones, of Nevada, gave this firm large orders for ice plants. The first one was for a plate ice plant, the intention being to freeze a plate twelve inches thick, twelve feet high and forty feet long—probably the largest plates ever built. The ice was to be loosened by hot ammonia gas and the blocks cut up by vertical saws. Several machines were built that year. In 1877, Mr. Enright designed and built a machine having a vertical double-acting compressor, and in the fall of the year, one of this type was installed in the brewery of A. Ziegele, of Buffalo, N. Y. In 1878, patents were issued to the inventor, not only for his double-acting compressor, but for the pipe joint commonly known as the Arctic.

With the making of their machines, in 1876, or, at least soon after, F. M. McMillan & Co. commenced the manufacture of anhydrous ammonia, although a patent for the drying of the gas was not issued to Mr. McMillan until March, 1879. In 1878, the Arctic Ice Machine Manufacturing Co. was incorporated, both Mr. Enright and Mr. McMillan being interested in it.

The plate system of making ice was the invention of Capt. David Smith, and letters patent were granted him on February 8, 1876. The first plate machine ever constructed was built in Oakland, Calif., and was of five tons capacity.

Charles J. Ball installed the first ice making machine at Sherman, Texas, in 1878. It was a modified Carré machine, which made about five tons of ice daily, the actual cost of installing being about \$12,000. In 1878, the first compression machine made by C. J. Ball, was erected at Dallas, Texas. Upon his retirement, he was succeeded by his son, P. D. C. Ball, who conducted the business under the name of the Ice & Cold Machine Co., until 1920, at which time the name of the company was changed to the Ball Ice Machine Co.

The first De La Vergne refrigerating machine was placed in the Hermann Brew-

ery, New York City, 1879. One of the inventors of the original apparatus, John C. De La Vergne, was engaged in the brewing industry in 1876, and in 1881, he formed the De La Vergne Refrigerating Machine Co., for the manufacture of the so-called De La Vergne-Mixer Machine, the second patentee being William M. Mixer, of New York.

Frick Company Enters Field in 1881

The refrigerating department of the Frick Co., originated about 1881, when either Mr. Jariman or Mr. Ferguson, of Baltimore, Md., submitted plans of machinery to George Frick, and plants were subsequently erected for several parties in that city. In the following years, Mr. Ferguson worked on a new design for a compressor, the idea being to construct an ammonia cylinder to be used as a refrigerating machine. Frick Company constructed a few of these machines for Mr. Ferguson and then commenced to manufacture for themselves. The first of their improvements were placed in the brewery of Henry Werner, Baltimore, Md., in 1885.

About 1885, W. G. Lock, an engineer of Sidney, Australia, patented a compound compressor for ammonia, consisting of two single-acting high and low-pressure pumps, side by side. Patents, covering the idea, were issued as early as 1867, and the Lock improvements, together with the St. Clair compound machine, manufactured by the York Manufacturing Company, were great improvements on the originals. Thomas Shipley, vice-president and general manager of the company, made a number of important changes and improvements on the originals and also patented other improvements on ice making and refrigerating plants.

Shambeau Electric Co. Will Sell Copelands in Oshkosh, Wis.

The Shambeau Electric Co., Oshkosh, Wis., has been formed and will sell Copeland electric refrigerators as well as sell radios.

Why . . .

Servel Sells Easily

. . . to women

Your women customers will like the trim lines of Servel and its

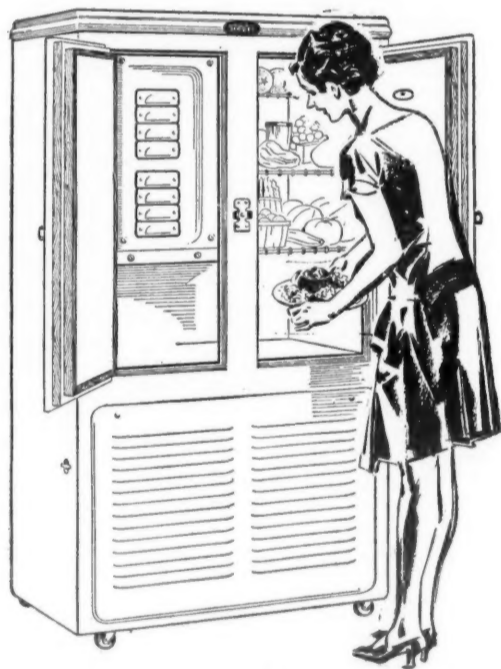
smooth, flat top

Flowers or fruit placed on the top of Servel add one more touch of modern cheer to the kitchen. Multitone colors help, too. And the instant women open the door of the food compartment they note that glistening, white porcelain lining.

Women like the convenient ice cube trays. They like the nicked brass latch and the tight-fitting door. And instantly they discover that the

lowest shelf is conveniently high

No kneeling cushion required to find the butter or salad dressing in Servel.



Servel sells easily to women . . . and their husbands. For details of our merchandising plan, copies of attractive color folders and proofs of newspaper advertising for dealers' use, address us at Evansville.

Servel Sales, Inc.

Factory and General Offices: Evansville, Indiana
Administrative Offices: 51 E. 42nd St., New York

OAKLAND

CHICAGO

LOS ANGELES



convenience

economy

multitone colors

quietness

quality cabinets



*Extracts from historical data published in the Ice and Refrigeration Blue Book and Buyers' Guide, 1926 edition.

Fortunes have been built on less

The PLYMETL assembly plant plan is based on correct economic principles of

SUCCESSFUL BUSINESS

1. High quality product

2. Rapidly expanding field

3. Low shipping costs

ASSURING BIG PROFITS

Sell Quality and Make Real Money

Money can be made selling PLYMETL Refrigerator Cabinets which are built with the highest quality standards possible. PLYMETL cabinets are as different from the old ice box as electrical refrigeration is from ice. For example, the old wooden corner posts have been eliminated, so that the cork insulation can be made continuous with no breaks at the corners, resulting in greatly increased efficiency. Also, there are no open joints in the exterior surfaces to permit air to reach the insulation and cause the condensation and decay which ruin the ordinary cabinet.

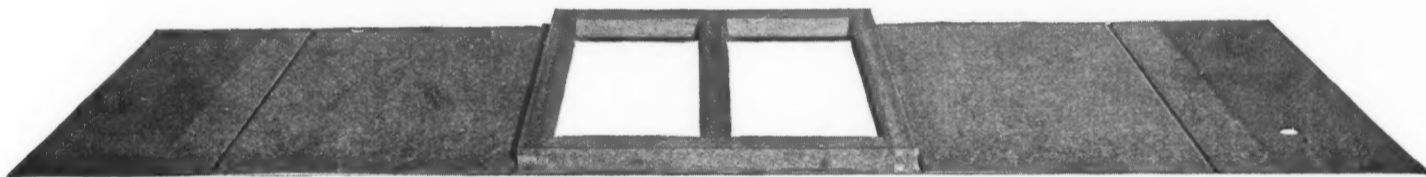
Low Cost of Shipping Insures Success

This is not just "another good cabinet." In addition to its superior features of construction, it is unique in its method of distribution. The cabinet is fabricated in flat panels in our plant and shipped knocked down to the local assembly plant, where the finishing operations are performed. Shipping the cabinets flat saves transportation costs running as high as 50%. This saving, of course, varies greatly with distance, but, in general, it ranges from \$6 to \$26 per cabinet. This big saving combined with the high quality of the cabinet and the unlimited field presents an unprecedented opportunity for establishing the universal business objective—a substantial, profitable, commercial success.

Big Field Assures Big Profits

Profitable business is sure to come in increasing volume to the man or organization handling a quality product like PLYMETL cabinets in a field expanding as rapidly as electrical refrigeration. This opportunity is not limited to the big metropolitan centers. Any city in which the total sales of electric refrigerators is now three or more a day represents a profitable market for a PLYMETL cabinet assembly plant. As the market increases, such a plant will reap a big harvest.

shipped flat at low cost



A flat PLYMETL panel as received by the local assembly plant from HASKELITE factory

WHY DEALERS and CUSTOMERS PREFER PLYMETL REFRIGERATORS

1 Air tight exterior walls.

2 Perfect finishing surface.

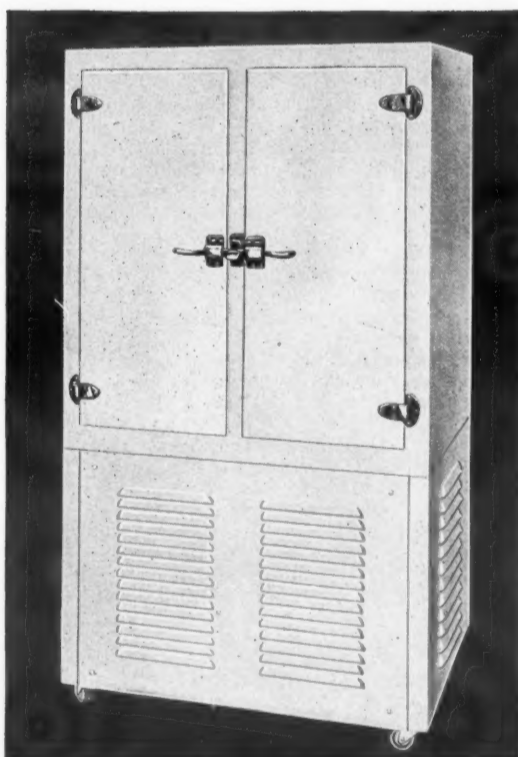
3 One-piece cork insulation cast in place, giving superior insulation, free from joints.

4 Wood entirely eliminated for structural framework, assuring maximum insulation.

5 Highest grade lining—Vitrolite proof to all acids except hydrofluoric.

6 Top of lining made of PLYMETL to support brine tank, a fool-proof support.

7 No moulding needed to hide open joints.



8 Machine base of sheet steel, assembled by spot welding.

9 Air-tight construction, preventing the breathing of the cabinet.

10 Stretcher leveled vapo metal used throughout—no rust problem.

11 Shelf supports suspended from the top, giving unobstructed walls easily cleaned and perfectly sanitary.

12 Outside air cannot enter cork wall chamber to condense and cause vermin infection.

13 Doors are fool-proof, will not warp, heat leakage around doors reduced to a minimum.

14 No nails or screws leading from exterior toward interior of cabinet, greatly reducing heat leakage.

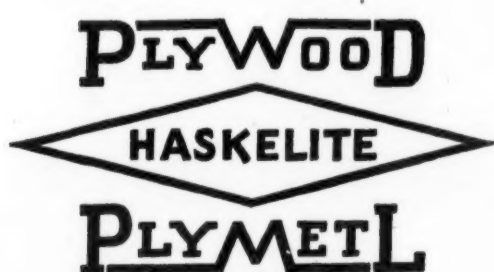
HOW FORTUNE BUILDING FRANCHISE IS SECURED

We are closing franchises for local PLYMETL assembly plants as rapidly as we make contact with qualified men or organizations. Manufacturers with unused floor space or reputable parties desiring a good paying business of their own will find the PLYMETL local assembly plan an unusual profit opportunity. On an investment of from \$5000 to \$10,000 in equipment, a plant capable of turning

out a half million dollars a year in PLYMETL cabinets can be established. The knocked-down PLYMETL construction is ideal for assembly under straight line construction methods in both large and small quantities. Thousands of cabinets were shipped and placed in service last year without a single claim for rebate or allowances. No charge is made for the franchise nor for the use of

the company's patents. Years of experience have shown us that the best results in the distribution of such products comes from individually owned and operated local plants rather than factory branches.

Complete details and full information will be furnished on request. Interested parties are invited to address



GEO. R. MEYERCORD, President
Haskelite Manufacturing Corporation

120 South LaSalle Street, Room 1120, Chicago, Illinois



E R N-9-12-Gray

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SEPTEMBER 12, 1928

Pioneers

INTERESTING data pertaining to the early history of mechanical refrigeration and efforts of pioneers to develop a satisfactory electrically-operated and automatic controlled machine are published in this issue. The story is by no means complete, owing to the limitations of space and the time required to collect the material. Additional articles will appear in later issues and these efforts will, we hope, inspire other old-timers in the industry to contribute their reminiscences.

Two purposes were in mind in planning this feature. First, it is important that the history of that phase of refrigeration, which includes the development of automatic household and commercial equipment, generally known as "electric refrigeration," be made a matter of record while the facts and figures may be obtained directly from those who participated. Second, the re-publication of such data as has already appeared in print is particularly worth while when we consider the thousands of newcomers who have entered the industry during the past two or three years. The younger generation—that large group which is now actively engaged in carrying the banner of refrigeration—has had little opportunity to learn of the work done in years gone by.

Any history of industrial development usually calls attention to the hardships experienced by those who ventured to depart from established customs. The lot of the pioneer seems ever to be a thankless one. Seldom does the originator of a new service to humanity live to reap the rewards due him. There are notable exceptions, it is true, cases in which fame and fortune are heaped upon the inventor. No doubt these examples serve to stimulate latent ingenuity but it is probably fair to say that the desire to accomplish, to render service, to make something better than it was before—that these incentives have been equally effective in maintaining the spirit of perseverance in many contributors to progress.

Work of the Inventor Only One Part of the Pioneering Job

It should be remembered also that the work of the inventor is only one part of the pioneering job. The function of the promoter who stirs the imagination of the investor is equally important. Often the promoter knows too little about the true possibilities of the device. He lives on faith and inspires faith in others. He is willing to risk many failures for one outstanding success. Few inventors have the ability to attract the capital required to float a successful enterprise. The promoter does his part, and a necessary one, although his methods may be questionable at times.

But even a model that will work and money to launch an enterprise are not sufficient in themselves. Skill in production processes—knowing how to produce the model economically in quantity is an essential factor. Seldom, it appears, is the inventor able to meet this requirement. He is never satisfied—always striving to bring his device nearer perfection. The successful production man is inclined to take a "practical" view of the situation. At some stage of the development he is willing to say "this is good enough for the present. We will call this model No. 1 and make a hundred or a thousand like it."

But the job is not done yet. Sales ability must be brought into the picture. The salesman who goes out calling on "cold prospects," those who have no knowledge or no conscious need for the product, is just as truly a pioneer as he who first conceived the idea. So are those who undertake to manage a great manufacturing and distributing organization, co-ordinating all the ramified forces which go to make up a modern business. These executives must necessarily trod uncharted paths, doing that which has never been done before, risking past reputations for success in new and untried fields.

Too much credit cannot be given to those who paved the way for the great industry which is now beginning to take shape. It seems reasonable to expect that the present generation will reap the financial rewards of which the pioneers may have dreamed. Ample honors also await those who solve the problems with which the industry is still confronted.

The First Frigidaire Bulletin



Above is reproduced the front cover of an 8-page bulletin said to be the first piece of Frigidaire literature ever issued. It contains a description of the Frigidaire unit as presented by C. C. Spreen at a meeting of the Ohio Electric Light Association in Toledo, March 19, 1919.

QUALITY PRODUCTS MADE FOR YEARS BY OLDER COMPANIES

THE "DRY-KOLD" REFRIGERATOR
COMPANY
Niles, Michigan

Aug. 31, 1928.

ELECTRIC REFRIGERATION NEWS,
Detroit, Michigan.

This is to acknowledge yours of Aug. 29th with editorial memo attached. Are we to understand that you desire from us any comment on this memo? If such is the case we would suggest that when you go into the history of mechanical refrigeration you bear in mind that for many years back mechanical refrigeration has been used in all important installations and that the only new feature of mechanical refrigeration is the extra activity in the last few years in behalf of small refrigerating machines, commonly called electric refrigeration.

Information as to the history of mechanical refrigeration can be obtained from reliable sources such as York Mfg. Co., York, Pa., and a few others who have been in the business for many years. It is this type of mechanical refrigeration which is most closely related to refrigerators for commercial use, such as manufactured by ourselves and others. There is a recent development in the line of small refrigerating machines for commercial uses which we are watching with much interest as many of these machines are being installed in connection with "Dry-Kold" refrigerators.

We note your reference to the fact that great progress is being made in the design and construction of what you term refrigerator cabinets. As a matter of fact, there have been for many years high grade, efficient, refrigerators for household use as well as for commercial purposes, manufactured by able concerns thoroughly conversant with the fundamentals of refrigeration. There have also been a lot of so-called refrigerators for household use almost useless from a refrigeration standpoint but we consider that these have been negative instead of representative. Refrigerators for commercial use have also included some cheap products of little or no efficiency but there have been available for many years commercial refrigerators of correct design, unquestionable efficiency, and quality, produced by various competent manufacturers in this line.

We dislike to see the impression given that the newcomers in the field of small refrigeration machines are the only manufacturers who have ever known anything about refrigeration. We believe it is unfair for this element in the field of refrigeration to assume that there were no real refrigerators before the present series of experiments were inaugurated, and we believe it is only just to call attention to the fact that there are now and have been for many years perfectly good refrigerators manufactured by able and successful

concerns grown up in the refrigerator business and understanding it thoroughly.

We believe too that it is entirely fair and pertinent to give due credit to the corporations and individuals who have developed the comparatively recent business in small refrigerating machines to its present large volume but it is true that mechanical refrigeration did not begin with this.

Yours very truly,
W. C. WHITCHER, Treas.

WHY SOME TRADE ASSOCIATIONS FAIL

(From American Machinist)

IN making an analysis of the causes of the failure of some trade associations to realize fully their opportunities, E. St. Elmo Lewis, counsel in trade and consumer relations, National Services, Inc., of Detroit, in addressing an industrial group, recently gave the following main causes for trade association failures:

(1) Failure to realize that a trade association is a business with unique problems of economic and human relationships, and that there is a special technique and experience necessary in organizing and conducting a trade association, just as there is in any other 1928 business activity.

(2) Failure to make a proper analysis of "the job to be done" by the trade or industry, which means fixing the relative position and tendencies of the trade; listing the various abuses and difficulties which retard its profitable progress, thus finding the trade problems common to the members as a basis of the association program.

(3) Failure to realize the necessity for both administrative and executive leadership, thus putting the work of the association in the hands of cheap, incompetent, time-serving men who waste time and money in theoretical futilities or the selfish pursuit of personal ends.

(4) Failure to realize that busy men will not and cannot give the time necessary to working out the details of association operation—no matter how great their personal interest—and thus fail to provide for the selection and maintenance of a competent staff necessary to skilled execution of well-defined and considered policies.

(5) Failure to realize that the job of a trade association executive is not a sinecure for a friend, or a refuge for a business failure.

(6) The trade association fails whose membership expects its sales problems to be solved, its competition to become enlightened, its technical education to be developed, its public to become informed, at no greater annual charge to each member than the expense of a salesman's evening entertainment of a first-class prospect.

Trying to Evade the Anti-Trust Act

(7) The trade association fails that spends its money and time trying to evade the price-fixing provisions of the Sherman Anti-Trust Act, and thereby hoping to

make real co-operation in the development of its markets, the education of the membership in better business methods, unnecessary.

(a) The trade association fails that exhausts its co-operative effort in passively "resolving," or in drawing up vague ethical "creeds," or in formulating codes of practice that are impractical; or that expects, by merely displaying practical codes on office walls, it can automatically eliminate all the human cussedness that makes a warfare of business.

(9) The trade association fails when it does not furnish practical working data on production, finance, marketing, merchandising, advertising, sales, and general business control—and specialists who can interpret the data in such a way as to give each member a true picture of the tendencies in the whole trade and his relation to them.

(10) The trade association fails that does not realize in fixing its plan of organization and program of operation, and in selecting its executive personnel, that the effective trade association is a co-operative method of furnishing skilled staff guidance to the entire trade in the keen competition between trade for a share of the consumer dollar.

(11) The trade association fails that stops at the golf-playing, good-fellowship stage, however, much friendliness helps at every stage of a more practical program.

(12) The trade association fails whose members do not "play the game" because they are "too big and don't have to," or "so little it does not matter."

Mr. Lewis said, also, that there are four things every trade association must do:

(a) It must have an aggressive, faithful and competent leadership and a membership loyal to the purpose and plan.

(b) It must have a plan of action based on a competent, unbiased analysis of the trade's requirements.

(c) It must have an adequate and competent staff to do the work.

(d) It must have a program that realizes the necessary time, and a budget that fully covers the expense of putting the plan into execution.

TWO JOURNALISTS JOIN NEWS STAFF

Miss Helen Penn, formerly of Oklahoma City, has joined the staff of ELECTRIC REFRIGERATION NEWS as assistant editor devoting special attention to news and research concerning food protection. Miss Penn was graduated from the University of Chicago, specializing in bacteriology and has had considerable practical experience in laboratory analysis. She is also a graduate of the School of Journalism of the University of Missouri. John Drittlér, a graduate of the School of Journalism of the University of Detroit, has joined the editorial staff as assistant editor and will have charge of news concerning activities of distributors and dealers.

F. W. Henkel, 306 So. Wabash Avenue, Chicago, Ill., publishers' representative, has been appointed local advertising representative of the NEWS in Chicago and Milwaukee and adjacent territory.

PROPOSES DRIVE AGAINST INSANITARY RESTAURANTS

Electric Refrigeration News,
Detroit, Mich.

It is a well-known fact that the refrigeration equipment in most of the cheaper class of restaurants, often those run by the foreigner, is not only inadequate, but, also is kept in the most insanitary condition.

Their so-called refrigerators are in many cases crude home-made boxes, with no cork or other efficient insulation and, if bought outside, the cheapest junk handled by the second-hand fixture dealers.

These fixtures have usually changed hands many times. They have not the proper air circulation and could not give satisfaction even if they were kept clean and filled with ice daily. As it is, they have never been scoured and cleaned and are filthy and insanitary beyond description.

As you all know this to be a fact, the question now is: what can we refrigeration people do to better the conditions and see to it that the American public is not taken advantage of by this type of restaurant proprietor, who reaps profit at the cost of the health of our fellow citizens who are unfortunate enough to be forced to eat in these restaurants?

I would like to make the following suggestion: let us make a drive, seeking the aid of the health department, in each city, town and village. Let us bring these conditions to the attention of each health commissioner. Many of them are doctors that have never seen the inside of one of the restaurant refrigerators and who do not know the requirements of restaurant refrigeration equipment.

All refrigeration societies and associations should join in this drive. Each person failing to meet practical health requirements should be reported to the local health department and the public in general should be informed of the conditions.

W. H. S. Chicago, Ill.

The First Five Years in the History of the Isko Company

Note: Ten years ago the Isko Co. was engaged in a spectacular development of electric refrigeration for the home. The company was organized early in 1916. The following account of the first five years of the company's history appeared in "The Isko World" issued in June, 1921 (Volume 1, No. 4). Copies of the company magazine, photographs of the machine, and samples of sales literature were contributed by G. M. Johnson, 186 Lovejoy Avenue, Waterloo, Iowa.

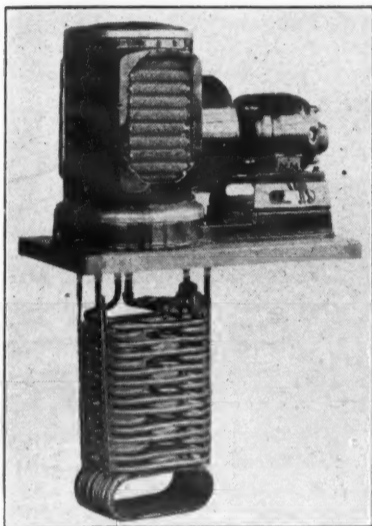
THE first Isko machine was built in Detroit early in 1916 by Isko, Incorporated. When Isko, Inc., was organized, it bought out the Mechanical Refrigerator Co. of Chicago, moving all machines, equipment, dies, jigs, fixtures, tools, etc., to Detroit. The factory was located at 1735 Mt. Elliott Avenue, and it was here that the first Isko machines were built.

The Mechanical Refrigerator Co. had spent something over four years in the development of an electrically driven, automatic, mechanical refrigerating machine of a size suitable for domestic installation. This machine was of the single cylinder, reciprocating type, air-cooled, and belt-driven. The condenser consisted of approximately 120 feet of one-half-inch copper tubing in the form of a coil from the top of the compressor to the expansion valve.

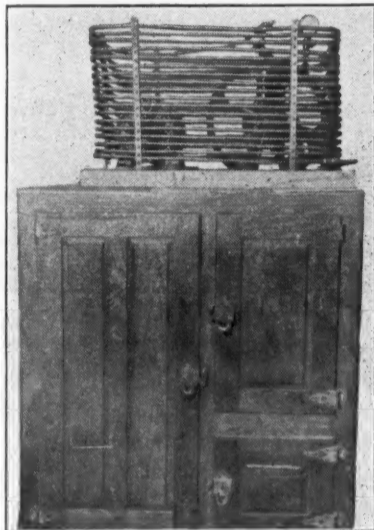
The condenser coil in this and other

about one inch, as was the face of the motor pulley, and a wider belt used in order to secure better traction. Also the motor was changed on the R. B. machine from the 1/4 H. P. 1165 R. P. M. previously used to a 1/4 H. P. 1750 R. P. M. motor. There were over 1,500 of the R. B. type machines built and practically all of them are still in service.

All of the machines mentioned above were equipped with the Anderson type switch and thermostat until the beginning



Early Isko machine using direct expansion freezing unit



Two-cylinder Model C B Isko with bird-cage condenser coil

early machines, known as the C. B. model, looked very much like a bird-cage and is responsible for the nickname they bear today. A direct expansion coil was used which consisted of 130 feet of one-half-inch tubing wound with a freezing compartment for freezing small ice cubes on the bottom. The balance of the coil was wound in such a manner as to secure the maximum of radiating surface for a given space, this coil being tinned to prevent corrosion. About seventy-five of these machines are still in service.

This type of machine was followed later in 1916 by a machine of practically the same design, the only change being from the single cylinder compressor to an eight cylinder rotary piston compressor of the Gnome type. Of this model four hundred and fifty were produced, and about one hundred and eighty are still in use. The Gnome type compressor was subsequently eliminated, largely for the reason of the difficulty in production and its inaccessibility of service.

The next change was to a two-cylinder reciprocating compressor with an eccentric type crank shaft and an automobile type valve assembly. This compressor was also found to be not entirely satisfactory and most of them were called in and exchanged for a later type. However, about five hundred of these C. B. machines in which the compressors were replaced, are still in service.

The later type compressor above referred to was known as the Model R. B. and was a two-cylinder reciprocating type. This went into production early in 1917. The principal change in design at this time, besides the compressor, was in the condensing coil which was replaced by an automobile type radiator. An idler arm was added to prevent belt burnouts, and the size of the flywheel face was increased

of 1918, when the G. E. thermostat was adopted.

During the development period, many improvements were made in the design of the condenser, expansion valve, expansion coil, automatic, etc. A great deal of valuable information and knowledge was gained through field trials, from installing and observing machines under actual operating conditions which vary greatly in different parts of the country, due to climatic and other conditions.

It was during this period that the nucleus of the distributing organization was developed, consisting of approximately 25 distributors in different parts of the country, and much valuable data was gained from their experiences and criticisms.

It was found that the air-cooled machine did not meet all climatic conditions, as there are many sections of the country where the atmospheric temperatures average so high as to preclude satisfactory operation of the air-cooled type. With this idea in mind, it was decided, in February, 1918, to change from the air-cooled type to the water-cooled machine. A new company was organized under the name of The Isko Company, and manufacturing rights for the present rotary herringbone gear compressor purchased from the Leonard Pump & Motor Company.

This pump has many advantages over the compressors previously used, due to the elimination of the valve assembly and the many moving parts necessary with a reciprocating compressor.

The first developmental work on this gear type machine was done by the Frost-maker Co. of Chicago, who spent approximately four years perfecting the Frost-maker machine. It was built in five different sizes—250 lb., 500 lb., 1,000 lb., and one ton and two ton. About 100 of these

machines of all sizes are still in service, most of them in Chicago or vicinity.

The Isko Co. designed its first gear type machine for use by the Emergency Fleet, and the Government tests were made at the School for Bakers and Cooks at Camp Meade, Maryland. Before the tests could be completed, however, the armistice was signed and the order cancelled.

From these two machines, the Frost-maker and the Emergency Fleet machine, the present Model 20 and Model 200 machines were developed and the first ones were put into service in the summer of 1919.

It is interesting to note that The Isko Company has at its factory one of the small Frostmaker machines which has a record of over 40,000 hours of continuous operation.

NEW AMSTERDAM AND CREDIT ALLIANCE CORPS. MERGED

The Credit Alliance Corp., 149 Broadway, New York City, has acquired all shares of the New Amsterdam Credit Corp., and the two concerns will be merged August 1, according to an announcement by Clarence Y. Palitz, president of the Credit Alliance Corp.

Total resources, it is said, will exceed \$30,000,000 making the Credit Alliance Corp. the largest company of the kind specializing in financing sales of labor-saving machinery and equipment.

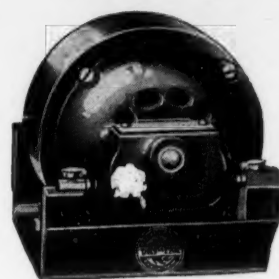
Edward S. Maddock, president of the New Amsterdam Credit Corp., will become director and chairman of the executive committee of the new firm.

Philadelphia Scene of Frigidaire Dealers' Meeting

Frigidaire dealers and salesmen in the vicinity of Philadelphia, Pa., attended a meeting held at the Bellevue-Stratford in Philadelphia on August 22. J. P. Gallo-way, zone manager, and H. C. Kimball reviewed the outlook for the remainder of 1928 for that territory.

Day-Fan

RADIO · MOTORS · FANS
PRODUCTS



A sample test motor will be shipped to any interested manufacturer on request.

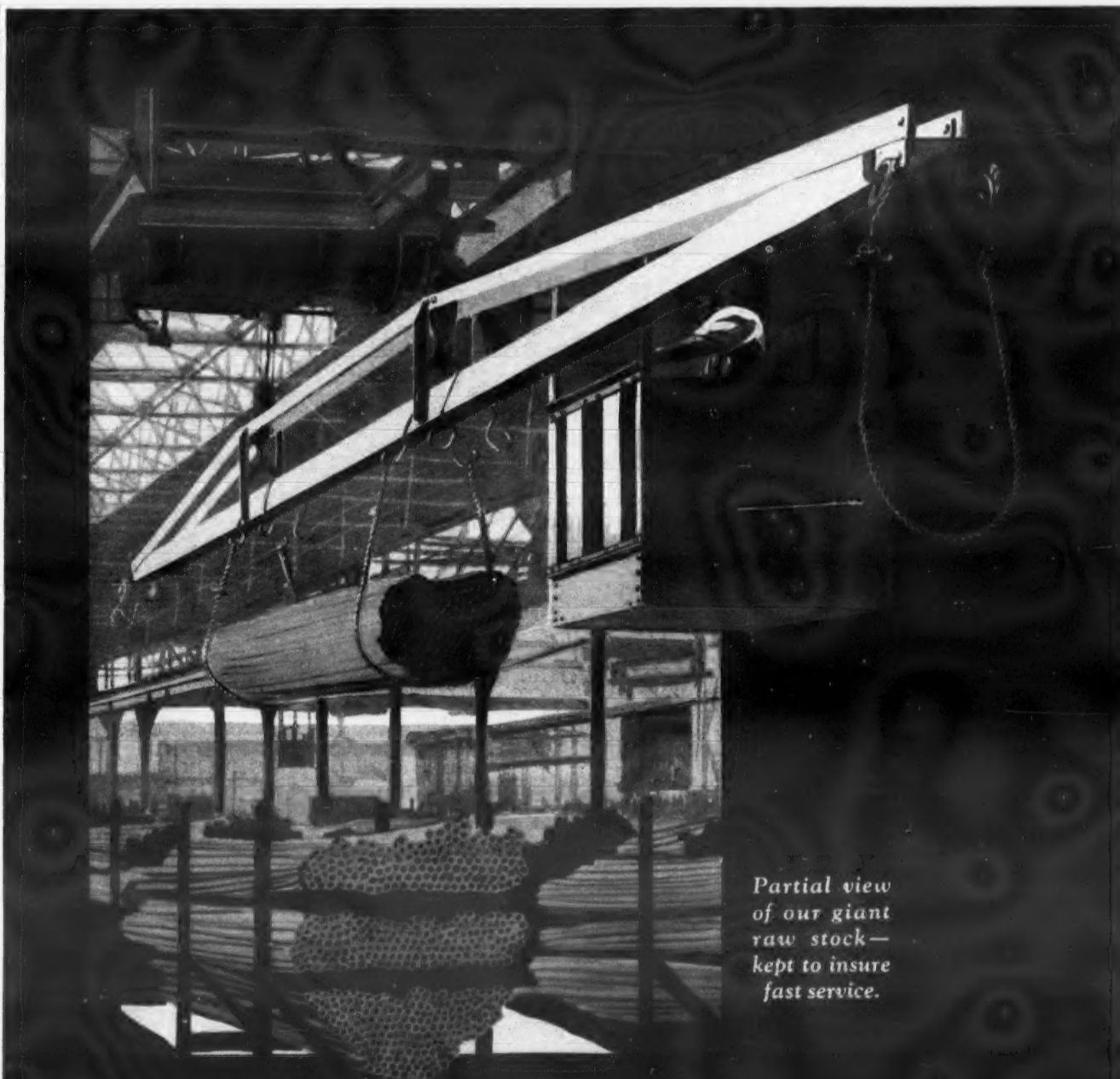
TO the designing and construction of a motor for refrigerating systems especially, Day-Fan Electric Company has brought the experience of 39 years of manufacturing high grade electrical apparatus. Day-Fan fans and motors have won world-wide recognition for dependability.

High power factor and efficiency, low initial cost, low cost of operation—are characteristics of the Day-Fan motor.

THE DAY-FAN ELECTRIC COMPANY
DAYTON, OHIO

LASSEN — TEMPERATURE — CONTROLS

POSITIVE RANGE AND DIFFERENTIAL ADJUSTMENT
NON-DETERIORATING MERCURY TUBE SWITCH—MEET ALL REQUIREMENTS
GOODNOW & BLAKE MFG. CO. 3840 BEAVER STREET
DETROIT, MICH.



Partial view of our giant raw stock—kept to insure fast service.

50 MILES OF TUBING

Pile after pile of raw stock, brass, aluminum, copper—ready to draw, to anneal, to form—in this great 5 acre plant. For one pound or one million pounds—get our prices. Send your specifications.

WOLVERINE TUBE CO.

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Sales Offices: Cleveland, Chicago, Atlanta, Los Angeles, Denver, Rochester, N. Y., Dayton, Ohio, New York City, Dallas, Texas.

SULPHUR DIOXIDE

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SULPHUR
DIOXIDE

Universally used in the production and servicing of refrigerating machines. Prepared for direct charging, with absolute protection afforded by complete laboratory analysis of each cylinder, large or small.

Exceptional dryness maintained as an additional safety factor
Ten sizes of cylinders from 2 lb. to 150 lb. capacity.

SO₂

ANSUL CHEMICAL COMPANY
MARINETTE, WIS.

Canadian Distributor
GRASSELLI CHEMICAL CO. Ltd.
Toronto—Montreal

Western Subsidiary
ANSUL CHEMICAL CO. of Calif.
Modesto, Calif.

COPELAND PRODUCTS ORGANIZED IN 1920

Progress Has Been Steady in Past Eight Years

FROM a tiny factory in Flint to a large plant in Detroit, occupying two spacious factory buildings on Lycaete Ave., the Copeland Products, Inc., has made steady progress in the past eight years.

Organized in 1920 by E. J. Copeland, one of the founders of the Kelvinator Corp., the Copeland company devoted its attention to manufacturing refrigeration units to be installed in owners' ice boxes.

In the spring of 1925, Detroit capital, seeing the possibilities in the electric refrigeration industry, acquired possession of the Copeland company and moved the plant to Detroit, occupying a building which now forms one of the units of the present plant. Heading the new company, was William Robert Wilson, at that time president of the Guardian Trust Co. of Detroit. Mr. Wilson brought to the company a wealth of financial experience and much of the success of the company is due to his skillful handling of its affairs while it was struggling to win a place for itself. From 1921 to the end of 1923 Mr. Wilson was president of the Maxwell-Chalmers Co. and is now the president of the Murray Corp. of America.

As soon as he had taken hold of the new company, Mr. Wilson began to gather around him men of acknowledged ability in production and sales work, many of them having built their reputation in the automotive field. He procured George W. Mason, who had been works' manager of the Chrysler Motor Corp., as vice-president and general manager. Having been in charge of the entire manufacturing division of the Chrysler Corp., Mr. Mason was ably fitted to meet the problems of building up production in electric refrigeration.

To handle the sales end of the business, Mr. Wilson obtained W. D. McElhinny as vice-president in charge of sales. Mr. McElhinny had had a long experience in the electric refrigeration business, having been with the Delco-Light Co., manufacturers of Frigidaire, for seven years, part of that time as sales manager in charge of the Frigidaire commercial refrigeration division.

C. W. Hadden, who for several years was connected with the administrative department of the Maxwell-Chalmers interests and later was general sales manager for the Velie Motor Corp., was added to the executive staff.

E. H. Brown, who had been vice-president of the General Aluminum and Brass Co., was brought to the Copeland company as secretary and treasurer.

A. M. Taylor, formerly advertising manager for the Franklin Automobile Co., and also of the Velie Motors Corp., was secured as manager of advertising and sales promotion.

To handle the complex engineering problems facing the business, Glenn Muffly was added to the staff as chief engineer. Mr. Muffly had been associated in an engineering and consulting capacity with such well-known firms as Westinghouse, Lees-Bradner and later with General Motors.

The company grew rapidly, at the same time maintaining a conservative policy. On January 1, 1926, it had a total of 250 sales outlets in the United States. A year later this had increased to approximately 700 outlets and by the middle of 1928 the company had approximately 2000 sales outlets in the United States.

An export business of considerable size has been built up by the Copeland company, this being under the direction of the H. M. Robins Co. of Detroit, so that now Copeland has representation in practically every country in the world and export shipments have shown a steady increase.

Under the guidance of the new personnel, the company's business has grown with marked rapidity. Shipments for 1926 showed an increase of 500 per cent over those of 1925, while those for 1927 showed another considerable increase. And for the first six months of 1928 shipments were equal to those of the entire year in 1927.

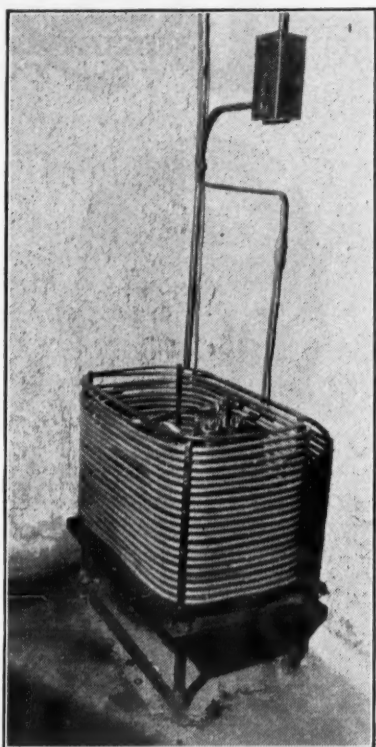
Dating back from early in 1926, the Copeland line has been broadened extensively. Whereas at the first the company manufactured only a few units adapted for installation in owners' ice boxes, the line today includes 17 complete models with cabinets ranging in size from 5 cubic feet to 20 cubic feet. These cover a price range from \$195 at the factory to \$720.

Within the past few months the company has added to its line multiple installation units, as well as a complete line of units for commercial installation purposes. A considerable portion of the company's business comes from the manufacture of electrical water coolers, of which four types are now being manufactured. A new line of milk coolers and bottle coolers is also expected to add materially to the business of the company.

In the spring of 1928 George W. Mason was elected to the presidency of Copeland Products, Inc., and Mr. Wilson became Chairman of the Board.

On the first of August, 1928, the company took possession of a new factory

EARLY KELVINATOR



One of the first Kelvinators sold outside of Detroit. This machine was installed in the home of A. S. McBurney, Jackson, Mich., in 1916. The original compressor is still operating, and a new V-belt has been the only replacement needed in 12 years.

building, practically doubling its manufacturing facilities and providing for larger office and shipping facilities.

Branching out from the direct field of electric refrigeration, Copeland Products, Inc., now holds exclusive sales rights on the new process of refrigeration known as Silica Gel in all fields except those of steamships and railroads through a contract with the Silica Gel Corp., a subsidiary of the Davison Chemical Co. of Baltimore, Md. In order to promote the interests of this new type of refrigeration process, a subsidiary company was formed in the spring of 1928 known as the Copeland Silica Gel Corp.

FOREIGN SHIPMENTS OF ELECTRIC REFRIGERATORS

July Exports Reported by Bureau
of Foreign and Domestic
Commerce

Country of Destination	Units up to 1-Ton Capacity	
	Number	Value
Austria	106	\$ 20,800
Azores and Madeira Islands	5	1,010
Belgium	42	8,348
Denmark	27	5,918
Finland	45	8,546
France	14	1,773
Germany	47	9,426
Italy	65	19,549
Netherlands	34	6,396
Portugal	18	3,985
Rumania	1	177
Spain	103	30,940
Sweden	81	15,965
Switzerland	52	7,898
United Kingdom	48	7,240
Canada	1,493	206,342
Costa Rica	3	562
Guatemala	1	364
Honduras	7	648
Nicaragua	1	315
Panama	33	8,117
Mexico	44	13,083
Bermudas	16	3,219
Jamaica	1	487
Other British West Indies	3	835
Cuba	80	8,098
Dominican Republic	16	4,476
Netherland West Indies	1	423
Argentina	98	21,283
Bolivia	7	1,500
Brazil	268	45,784
Chile	1	221
Colombia	42	9,284
Ecuador	2	325
Peru	11	2,428
Venezuela	35	7,580
Aden	2	471
Arabia	2	203
British India	107	19,819
British Malaya	1	182
Ceylon	1	283
China	14	3,219
Java and Madura	14	2,155
Hong Kong	7	925
Japan	3	853
Palestine	1	250
Philippine Islands	47	9,294
Siam	6	959
Australia	153	36,640
New Zealand	10	3,792
Union of South Africa	43	11,283
Egypt	2	497
Algeria and Tunisia	11	1,240
Other Portuguese Africa	1	105
Other Spanish Africa	1	233
Total	3,277	\$575,748

C. C. Spreen Returns from Trip Through Interior of Alaska.

C. C. Spreen, chief engineer of Kelvinator Corp., Detroit, returned September 1 from a trip through the interior of Alaska on which he started during the latter part of July.

His chief interest being in refrigeration, Mr. Spreen investigated and found that the principle means of preserving in the sections visited by him, consisted of an aerial cache. Four posts are driven into the ground and on top of these, ten or fifteen feet in the air, is built a shelter in which meats and other perishable foods are kept.

Takes Agency for Icelet Machine.

The Continental-Kellers Co. of Council Bluffs, Iowa, has taken the agency for the Icelet electric refrigerator. The Continental-Kellers is tied up with thirty other furniture houses and all will handle the Icelet. Mr. Rosenfeld, manager of Continental-Kellers, is also secretary for the company and made the arrangements for the deal whereby all stores are enlisted.

It is the intention of the Icelet Co. not to take on any additional outlets until after January 1, as the Continental-Kellers together with the Omaha local agency can dispose of all output during the remainder of 1928.

Kelvinator Offered as Prize in Seattle Movie Star Contest

The Kelvinator Radio Sales Co., Seattle, Wash., is offering a Kelvinator as a prize in a film star identification contest being conducted in that city. Photos of stars are flashed on the screen in movie houses and patrons entering the contest are expected to name the stars correctly.

Mueller forged Fittings For Mechanical Refrigeration



Forged Union Nut
This nut is made to meet the demand of an exceptionally strong fitting.

A complete line of fittings are carried in stock—always, for quick shipment

Mueller fittings can be supplied to suit your special requirements



Flared Tube Elbow

Send us samples or blue prints for quotation

Mueller Brass Co.

PORT HURON, MICH.

THREE GENERATIONS OF BRASS MAKING

ATLAS



REFRIGERATOR CASES

Are you getting any merchandising assistance from your present crating methods? Modern refrigerator packing can bring you big returns in this respect. Use Atlas Refrigerator Cases and know the advertising value of these superlative plywood refrigerator packs. Sturdy, fine appearing Atlas Cases attract

dealer attention and favorable comment all along the line. Your own trade mark printed on an Atlas Case tells the world you are a progressive manufacturer with pride in your product.

Our representative can show you other big features. Shall we have him call?



General Offices

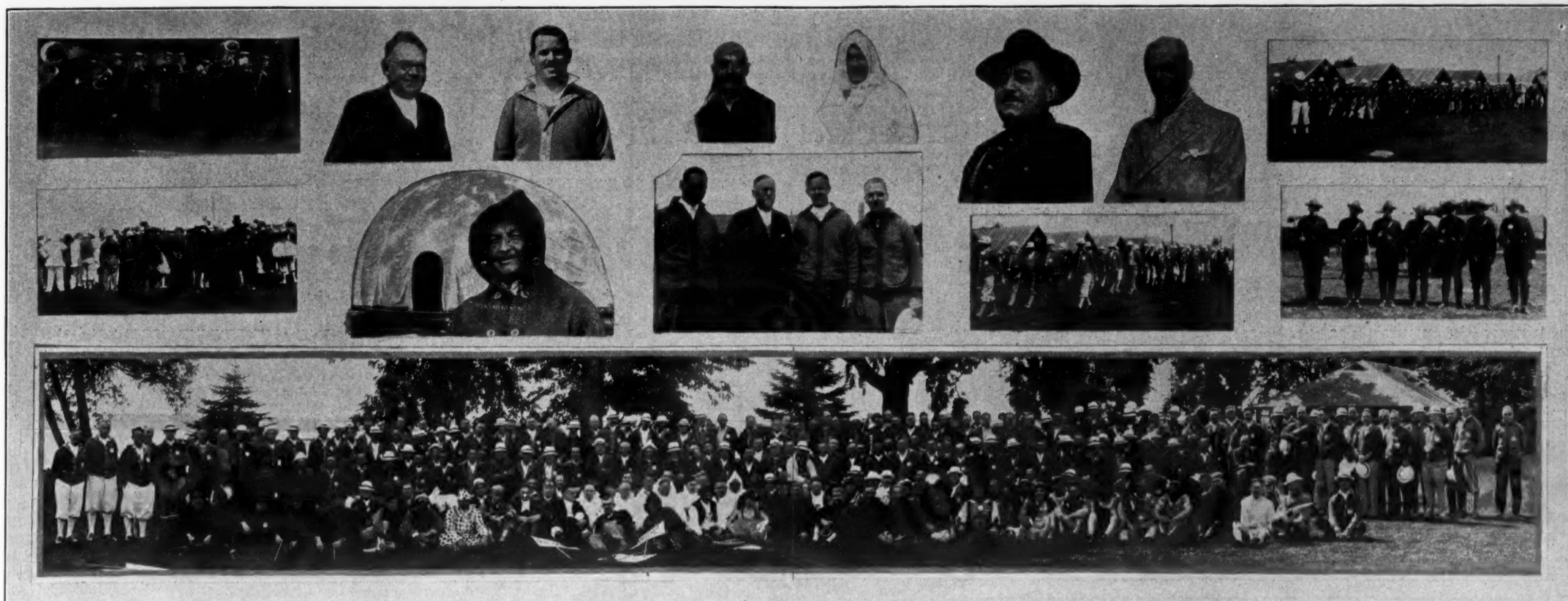
PARK SQUARE BUILDING, BOSTON, MASSACHUSETTS

New York Office, 90 West Broadway - Chicago Office, 649 McCormick Bldg.

Southern Division (formerly Empire Mfg. Co.) Goldsboro, N. C.

Branch Factories: Grand Rapids, Mich. Bloomington, Ind. Jamestown, N. Y. and in nine other cities 2161

General Electric Distributors Work and Play at Camp Refrigeration II



BUSINESS PROGRAM OF CAMP REFRIGERATION AT ASSOCIATION ISLAND

(Continued from Page 1, Column 5)

Tuesday, September 4, 1928

P. B. Zimmerman, Chairman.

9:00 A. M.—Opening Address with Flag Raising.—Dr. Charles A. Eaton.

10:00 A. M.—I. "The Distributors Retail Activity."—George W. Belsey.

The following subjects will be covered by this paper: each distributor is requested to be prepared to discuss these activities:

1. The Value of Branch Stores in Other Cities.
2. The Value of Neighborhood Stores.
3. The Selection of Store Locations.
4. The Retail Sales Manager's Activity.
5. Methods of Obtaining Salesmen.
6. Steps in Making a Retail Sale.

Wednesday, September 5, 1928

9:00 A. M.—(Continuation of the discussion of the Distributors' Retail Activity.)

7. Value of Supervisors.
8. Compensation Plans for Salesmen.
9. Number of Salesmen for Urban Quota.
10. Training Salesmen.
11. Closed versus Open Territories.

II. Distributors' Wholesale Activity.—J. O. Morris.

This discussion to cover the following subjects:

1. Types of Retail Outlets—
 - a. Dealers.
 - b. Central Stations.
 - c. Department Stores.
 - d. Resale Arrangements.
2. Exclusive Territories for Dealers.
3. Use of Sub-retailers.
4. Using one Contract Man. for Each 15 Outlets.
5. Dealer Contracts.
6. Quota Plan with Retailers.
7. Function and Value of Dealer Meetings.

Thursday, September 6, 1928

III. "The Distributors' Apartment House Activity."—R. Cooper, Jr.

Discussion to cover the following:

1. Experience in Selling Old Apartments.
2. Experience in Selling New Apartments.
3. Necessity for Separate Apartment Specialist on Old and New Structures.
4. Compensation for Apartment Men.
5. Other Quantity Sales:
 - a. Public Institutions and Hospitals.
 - b. Fish Cabinet Business.

IV. "The Value of a Sales Promotion Department."—Judson C. Burns.

Discussion to cover the following:

1. Localizing the Manufacturer's Advertising.
2. Distributors' House Organs.
3. Better and More Thorough Use of Advertising Material.
4. Sales Developing Ideas.

V. "The Product."—C. E. Eveleth.

VI. "Function of the Product Man."—M. A. Glueck.

Discussion to cover the following subjects:

1. The Value of Factory Trained Men.
2. Relation of Product Man to Salesmen.
3. Value of Factory Training Course.

Friday, September 7, 1928

VII. "The Distributors' Administrative Activity."—Rex Cole.

Discussion to cover the following subjects:

1. Outline of Distributors' Organization.
2. Analyzing Operating Costs.

VIII. "Commercial Business."—W. E. Landmesser.

IX. "Co-operative Newspaper Advertising."—L. R. Edwards.

W. E. Underwood, O. D. Street—Lord & Thomas and Logan.

X. "Partial Payment Plans."—A. J. Morris, The Morris Plan Banks.

XI. "Report of Quota Committee."—L. H. Bennett.

XII. "Fall Activities."—W. J. Daily.

XIII. "Entering the Second Season of the Year."—A. C. Mayer.

"Summary of Conference."—T. K. Quinn.

ATTENDED CAMP

Name	Address
Ahrens, Albert	Ahrens Supply Co., Oklahoma City, Okla.
Alexander, W. D., Jr.	Alexander Seewald Co., Atlanta, Ga.
Angermeier, H. J., Jr.	Elect. Ref. Co., Louisville, Ky.
Bailey, John W.	John W. Bailey Co., Grand Rapids, Mich.
Banks, P. W.	Maine Electric Co., Portland, Me.

Top Row: (1) The Band; (2) C. Steenstrup, chief development engineer, General Electric Co., Schenectady; (3) R. Cooper, Jr., Chicago distributor; (4) George S. Miller, Washington, D. C.; (5) R. E. McMillan, La Crosse, Wis.; (6) Joe O. Morris, Albany, N. Y. (Chief of the Unmounted Police); (7) Rex Cole, New York; (8) The parade. Middle Row: (1) Around the flag pole for the opening address; (2) A. L. McCormick, Detroit, (Grand Itok of the Igloo); (3) P. B. Zimmerman, sales manager, George F. Morrison, General Electric director and president of the Association Island Corp., T. K. Quinn, general manager and H. C. Mealey, assistant to general manager; (4) Marching, uniformed in orange and blue blazers; (5) The "Royal Northwest Mounties." Bottom Row: Assembly under the famous old elm of Association Island.

O. G. Tinkey Joins Kelvinator Cleveland Co.

Otto G. Tinkey, formerly chief engineer of Kelvinator Leonard Corp., Pittsburgh, Pa., is now with The Kelvinator Cleveland Co., of Cleveland, Ohio. Mr. Tinkey is a member of the Detroit section of the A. S. R. E.

WORLD'S LARGEST MANUFACTURER OF REFRIGERATORS FOR ALL PURPOSES



In Commercial Refrigerators it's McCRAY

INQUIRE WHERE YOU WILL, in the field of commercial refrigerator manufacture, the name which commands instant and undisputed respect is McCray.

This is a prestige and position won by more than a third-of-a-century—39 years to be exact—devoted to building refrigerator equipment of the highest quality for every purpose. The McCray nameplate on a refrigerator has come to be recognized everywhere as the sterling mark of quality.

Dealers in electric refrigeration of any type find in McCray refrigerators a double selling advantage: first in the immediate acceptance of the McCray name and its prestige, and second in the enduring efficiency of the service it renders. Pure corkboard insulation is used in every McCray.

McCray builds refrigerators in many styles and sizes for every purpose—in stores, markets, hotels, clubs, restaurants, hospitals, institutions, florist shops, and homes. Write for catalogs and details.

McCRAY REFRIGERATOR SALES CORPORATION

Lake St., Kendallville, Indiana

McCRAY REFRIGERATORS

(Concluded on Page 12, Column 1)

Weather Forecast—Fur and Warmer



Caryl Bergman and Mary Gassman, two of Mr. Ziegfeld's beauties from "Rosalia," now playing at the New Amsterdam Theater, New York, prepare dinner with the aid of a combination Electrolux refrigerator and gas stove which cooks and freezes with gas.

G. E. DISTRIBUTORS AT "CAMP REFRIGERATION"

(Concluded from Page 11, Column 2)

Gould, Chas., Elec. Ref. Co., N. E., Boston, Mass.
 Graham, E. C., National Elec. Supply Co., Washington, D. C.
 Greenburg, Max A., Eastern Hdw. & Sup. Co., Atlantic City, N. J.
 Griffin, Hancock, G. E. Co., Schenectady, N. Y.
 Guerry, DuPont, Huntington & Guerry, Inc., Greenville, S. C.
 Halvorson, H. P., Eastern Service Co., Boston, Mass.
 Hamilton, O. C., G. E. Co., Cleveland, O.
 Hardy, Porter, Bouton, Hardy & Waddington, Salisbury, Md.
 Harrison, Philip H., Philip H. Harrison & Co., Newark, N. J.
 Hart, W. E., G. E. Co., Cleveland, O.
 Harvey, F. T., G. E. Co., New York, N. Y.
 Haskell, W. E., Electric Device, Springfield, Mass.
 Houserman, John, Ochiltree Electric Co., Pittsburgh, Pa.
 Hawkins, L. A., G. E. Co., Schenectady, N. Y.
 Head, A. F., Hoosier Elec. Ref. Co., Indianapolis, Ind.
 Heibel, W. E., G. E. Co., Cleveland, O.
 Hines, Dorsey F., The Hines Co., Baltimore, Md.
 Hitchborn, P., Rex Cole, Inc., New York, N. Y.
 Hogan, W. N., W. N. Hogan, Inc., Wheeling, W. Va.
 Holman, L. H., Elec. Ref. Co. N. E., Boston, Mass.
 Holtz, Max, G. E. Co., Ft. Wayne, Ind.
 Howard, E. R., Elec. Ref. Co., Chattanooga, Tenn.
 Howse, H. Kai, H. Kai Howse Co., Nashville, Tenn.
 Hutchison, W. M., G. E. Co., Cleveland, O.
 Hutt, L. P., G. E. Co., Schenectady, N. Y.
 Huxtable, Walter, Elec. Ref. Co., Milwaukee, Wis.
 James, L. D., James & Co., Inc., St. Louis, Mo.
 Johnson, A. H., The Hines Co., Baltimore, Md.
 Johnson, Carl, Johnson Bros., Wichita, Kans.
 Kehoe, J. J., G. E. Co., Cleveland, O.
 Keller, Harry, Philip H. Harrison & Co., Newark, N. J.
 Klaus, Henry L., Klaus Radio & Electric Co., Eureka, Ill.
 Klaus, Robert, Klaus Radio & Electric Co., Eureka, Ill.
 Knight, J. L., G. E. Co., Schenectady, N. Y.
 Kragtorp, B. F., B. F. Kragtorp, Sioux Falls, S. D.
 Kramer, J. F., James & Co., Inc., St. Louis, Mo.
 Laidley, H. D., Chicago, Ill.
 Lambert, E. L., Lambert & Simpson, St. Paul, Minn.
 Lamprey, Howard L., Howard L. Lamprey, Manchester, N. H.
 Landemare, Henry L., Philip H. Harrison & Co., Newark, N. J.
 Landmesser, W. E., G. E. Co., Cleveland, O.
 Leicht, E. J., Cushman Refrigeration Co., Cleveland, O.
 Levy, Maxwell L., Levy-Page Co., Norfolk, Va.
 Lockwood, R. G., Lockwood-Embrece Co., Roanoke, Va.
 Lutz, F. P., F. P. Lutz, Dayton, O.
 Mahony, M. F., G. E. Co., Albany, N. Y.
 Massini, J. J., Rex Cole, Inc., New York, N. Y.
 Matthews, H. W., Matthews Elec. Sup. Co., Birmingham, Ala.
 Mayer, A. C., G. E. Co., Cleveland, O.
 McCarty, Harry B., Harry B. McCarty Co., South Bend, Ind.
 McChesney, P. E., Gulf States Utilities, Beaumont, Tex.
 McCormick, A. L., Elec. Utilities Corp., Detroit, Mich.
 McCrea, C. L., Nat. Elec. Sup. Co., Washington, D. C.
 McManis, T. J., G. E. Co., Schenectady, N. Y.
 McMillin, R. E., Elec. Sup. & Equip. Co., La Crosse, Wis.
 Mealey, H. C., G. E. Co., Cleveland, O.
 Merrill, W. L., G. E. Co., Schenectady, N. Y.
 Merritt, E. E., Lake States G. E. Supply Co., Toledo, O.
 Miles, K. B., Elec. Ref. Co., Inc., Chattanooga, Tenn.
 Milhon, J. M., Electric Utilities Corp., Detroit, Mich.
 Miller, G. S., G. E. Co., Washington, D. C.
 Miller, L. H., Elec. Ref. Co., Louisville, Ky.
 Milnor, L. T., Milnor Ref. Co., Cincinnati, O.
 Montgomery, R. S., Dallas A. Shafer & Co., Richmond, Va.
 Morris, A. J., Morris Plan Banks of N. Y. C., New York, N. Y.
 Morris, J. O., Electric Sup. & Equip. Co., Albany, N. Y.
 Murphy, D., Elec. Device Co., Pittsfield, Mass.
 Myers, B. M., Woodward, Wight & Co., New Orleans, La.
 Neily, J. E., Modern Homes Utilities Co., Waterbury, Conn.
 Nelson, E. J., Storz Western Auto Sup. Co., Omaha, Neb.
 Newman, D. F., G. E. Co., Schenectady, N. Y.
 Newton, E. C., Newton Parsons Co., Hartford, Conn.
 Nielsen, L., G. E. Co., Schenectady, N. Y.
 Noll, W. C., G. E. Co., Cleveland, O.
 Norling, E. H., G. E. Co., Cleveland, O.
 Ochiltree, W. H., Ochiltree Electric Co., Pittsburgh, Pa.
 Orr, Clark, G. E. Co., Ft. Wayne, Ind.
 Osborne, G. E., Morley Bros., Saginaw, Mich.
 Ovalle, N. K., N. K. Ovalle, Inc., Harrisburg, Pa.
 Pangburn, E. C., International G. E. Co., Schenectady, N. Y.
 Parsons, Harry L., Newton Parsons Co., Hartford, Conn.
 Patterson, Geo. S., Florida Elec. Ref. Co., St. Petersburg, Fla.
 Pinney, A. J., Erco, Inc., Buffalo, N. Y.
 Pipkin, M. E., Rex Cole, Inc., New York, N. Y.
 Quinn, T. K., G. E. Co., Cleveland, O.
 Rafferty, Joe, Judson C. Burns, Inc., Philadelphia, Pa.
 Randel, Carl M., Judson C. Burns, Inc., Philadelphia, Pa.
 Rector, H. B., L. H. Bennett, San Francisco, Calif.
 Reid, C. E., Reid Bishop Co., Inc., Ft. Worth, Tex.
 Reid, W. G. A., Elec. Utilities Co., Detroit, Mich.
 Rice, M. P., G. E. Co., Schenectady, N. Y.
 Riddick, A. G., A. G. Riddick, Inc., Jackson, Miss.
 Ritter, B. C., G. E. Co., Denver, Colo.
 Roesch, C. E., G. E. Co., Cleveland, O.
 Rogers, A. C., A. C. Rogers, Dallas, Tex.
 Roeder, R. F., G. E. Co., Schenectady, N. Y.
 Ronning, N. B., G. E. Co., Cleveland, O.
 Rood, C. G., R. Cooper, Jr., Chicago, Ill.
 Ruck, Geo., G. E. Co., San Francisco, Calif.
 Sarchet, F. C., G. E. Co., Schenectady, N. Y.
 Sawyer, C. A., Maine Elec. Co., Portland, Me.
 Sawyer, P. H., Midwest Ref. Co., Des Moines, Ia.
 Scarborough, R. B., H. Kai Howse, Nashville, Tenn.
 Schaefer, E. H., Elec. Ref. Co., Milwaukee, Wis.
 Schmitt, S. A., Elec. Ref. Co., Evansville, Ind.
 Schmutz, H. L., American Electric Co., St. Joseph, Mo.
 Scott, Frank J., Gen. Contract Purchase, New York, N. Y.
 Searl, Earl J., Elec. Ref. Co., Spokane, Wash.
 Shannon, H. C., Elec. Ref. Co., Minneapolis, Minn.
 Sheen, H. L., Canadian Gen. Elec., Toronto, Ont., Canada.
 Slye, B. F., G. E. Co., Cleveland, O.
 Smith, C. G., G. E. Co., Cleveland, O.
 Smith, Gordon, Matthews Elec. Supply, Birmingham, Ala.
 Smith, H. P., G. E. Co., Cleveland, O.
 Sorenson, E. J., Wisconsin Elec. Ref. Co., Waukesha, Wis.
 Sorenson, S. W., Wisconsin Elec. Ref. Co., Waukesha, Wis.
 Spain, F. A., G. E. Co., Schenectady, N. Y.
 Spence, J. E., J. E. Spence, Altoona, Pa.
 Spicer, E. D., G. E. Co., Schenectady, N. Y.
 Spiers, L. J., Huntington & Guerry, Greenville, S. C.
 Sprau, Geo., Refrigerator Sales Corp., Tulsa, Okla.
 Steck, Robert, G. E. Co., Ft. Wayne, Ind.
 Steenstrup, C., G. E. Co., Schenectady, N. Y.
 Stevenson, A. R., Jr., G. E. Co., Schenectady, N. Y.
 Stevenson, R., Rex Cole, Inc., New York, N. Y.
 Stewart, S. E., Elec. Home Appliance Co., Charleston, W. Va.
 Lang, R. A., Glasgow, Stewart Co., Charlotte, N. C.
 Stiles, W. S., Morley Murphy Co., Green Bay, Wis.
 Stopple, Donald S., Wisconsin Elec. Ref. Co., Waukesha, Wis.
 Storz, Arthur, Storz Western Auto Supply Co., Omaha, Neb.
 Street, O. D., Lord & Thomas and Logan, New York, N. Y.
 Sullivan, Thomas J., Eastern Hdw. & Sup. Co., Atlantic City, N. J.
 Synovold, H., G. E. Co., Schenectady, N. Y.
 Taber, S. J., Dakota Ref. Co., Fargo, N. D.
 Tait, A. T., G. E. Co., Cleveland, O.
 Taylor, W. H., G. E. Co., Cleveland, O.
 Temme, R. S., Elec. Ref. Sales Co., Tacoma, Wash.
 Timmerman, W. M., G. E. Co., Cleveland, O.
 Toker, W. A., G. E. Co., Cleveland, O.
 Trabert, Arch W., Arch Electric Co., Inc., Portland, Ore.
 Trainor, S. G., Modern Home Utilities, Inc., Waterbury, Conn.
 Trawick, W. D., G. E. Co., Schenectady, N. Y.
 Truax, A. E., G. E. Co., Cleveland, O.
 Underwood, W. E., Lord & Thomas and Logan, New York, N. Y.
 Vaile, John W., Arkoma Co., Inc., Ft. Smith, Ark.
 Vaughan, J. E., E. O. Cone Co., El Paso, Tex.
 Wagner, P. C., G. E. Co., Cincinnati, O.
 Walker, J. E., Motor & Equipment Co., Raleigh, N. C.
 Walker, J. J., G. E. Co., Schenectady, N. Y.
 Walthall, B. M., G. E. Co., Richmond, Va.
 Wasson, G. C., G. E. Co., Cleveland, O.
 Weitzel, C. E., The Hines Co., Baltimore, Md.
 Wheeler, Clarence, Wheeler Ref. Co., Rochester, N. Y.
 Wheeler, Le Moine C., Wheeler Ref. Co., Rochester, N. Y.
 Whitesel, H. A., G. E. Co., Schenectady, N. Y.
 Willis, Dan H., The Willis Co., Canton, O.
 Wilson, E. L., G. E. Co., Schenectady, N. Y.
 Wolf, Frank, Erco, Inc., Buffalo, N. Y.
 Wolfe, O. N., Ochiltree Electric Co., Pittsburgh, Pa.
 Woodruff, H., G. E. Co., Schenectady, N. Y.
 Wortman, G. A., G. E. Co., Boston, Mass.
 Wright, R. C., The Wright Bros., San Antonio, Tex.
 Zimmerman, P. B., G. E. Co., Cleveland, O.

G. E. ANNOUNCES NEW DISPLAY REFRIGERATOR

The General Electric Co. electric refrigeration department, Cleveland, announces a refrigerator display cabinet model D-13 designed to meet the requirements of cafeterias, groceries, restaurants, drug stores, sandwich shops, and similar places of business.

Practically the entire area of the food compartment is exposed to view through four full length sheets of plate glass. These are set in felt with air-spaces between.

Two vertical doors in back of the cabinet give access to the storage space. These doors are triple hinged and are held closed by spring latches.

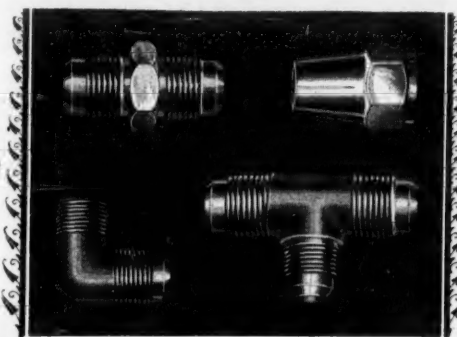
The outside over-all dimensions are: Height, 74 3/4 inches (without legs), width, 41 1/4 inches, depth (over hardware), 27 3/4 inches.

The interior finish of the cabinet is white porcelain on steel and outside of white lacquer with gray trim and the corners protected by polished metal.

The cabinet has a food storage capacity of twelve cubic feet, a food shelf area of eighteen square feet and is refrigerated by the General Electric DR-3 unit, which, as in all other models manufactured by that company, is placed on the top of the cabinet.

Kelvinator-Philadelphia Get Hospital Job

Kelvinator-Philadelphia, Inc., 36 South 17th St., Philadelphia, Pa., have recently received an order from the Hahnemann hospital for the installation of Kelvinator equipment. This order includes 21 cooling coils of various sizes, eleven WB compressors, one 44 tube evaporator and a special brine tank.



PIPE and TUBE FITTINGS

Made From Brass Forgings

For many years we have specialized in the manufacture of brass fittings, in small sizes, for connecting brass and copper tubing.

We are now producing similar parts made from BRASS FORGINGS—including a full line of forged nuts. These fittings are especially designed to meet the requirements of Iceless Refrigerator Manufacturers for fittings of a superior type. These fittings will not leak gas, air or liquids under mechanical pressure. They have the compact grain structure, high tensile strength and smooth, flawless surfaces found only in forgings. Our forged fittings are accurately machined, carefully inspected and individually wrapped and labeled.

Send a sample or blue-print for quotations on parts of a special nature. Catalogue No. R-30, showing our complete line of standard fittings, will be mailed on request.

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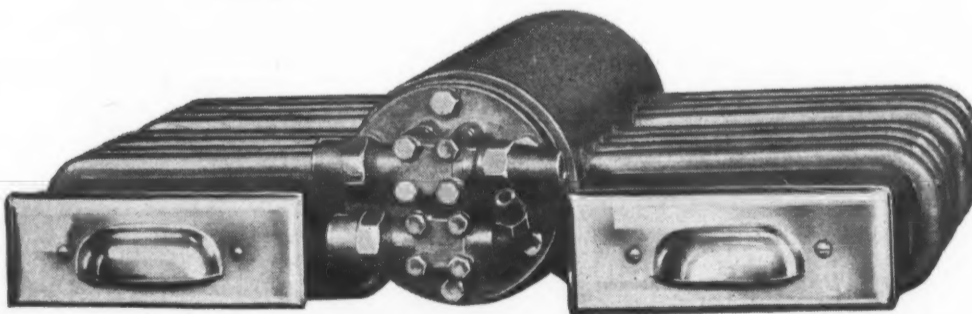
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Each appliance, or material, is the best that can be produced for the purpose intended and the resources and production experiences of the FEDDERS organization is solidly back of our intention to offer nothing but the finest equipment and materials to the refrigerating machine industry.



AIRWAY CONDENSERS

Making condensers and radiators has been our business for more than thirty years.

We will gladly co-operate with your own Engineering staff in suggestions of a constructive nature to improve, if possible, the operating efficiency of your unit.

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The Fedders line of float controlled evaporators, or boilers, is unsurpassed in appearance, or inherent quality of workmanship and materials. A greatly increased line of domestic and commercial boilers is ready for your approval.

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 320 Beaubien St., DETROIT, MICH.

GENERAL ELECTRIC CONTEST TAKE-OFF SCHEDULED OCT. 15

"On the Top of the World" Contest Starts Oct. 15, Ends Dec. 31

The General Electric Co., electric refrigeration department, Cleveland, has announced to its dealers and distributors an "On the Top of the World" airplane flight contest for retail salesmen, the take-off of which will be made on Oct. 15, at Cleveland, the imaginary planes returning to Cleveland on Dec. 31, the close of the contest.

The imaginary flight, outlined on folders which are being supplied to every dealer and distributor, goes from Cleveland to Buffalo and Niagara Falls, and then along the St. Lawrence River over Montreal and Quebec to St. Johns. The planes then take a direct course across to Cape York, Resolution Island, and then to the North Pole, which point is approximately the half-way mark in the trip.

From the North Pole return is started by way of Point Barrow and then across to Anchorage and down the west coast to Seattle. With a west wind behind them the planes enter the home stretch over Butte, Bismark, St. Paul, and Chicago to Cleveland, the entire trip being scheduled as approximately 10,000 miles and awarding the successful pilot of each plane 200 points in the contest.

Every \$100.00 in sales counts as one point or 50 miles toward the goal, and every point counts toward an attractive selection of prizes which are being offered. For salesmen who are specializing in apartment house sales, every \$100.00 in refrigeration sales counts as ten miles, or one-fifth of a point towards prizes.

Salesmen may cash their merchandise credits whenever they desire, or they may allow them to accumulate toward a larger prize at the end of the contest. In addition to other prizes, the five best point getters will get an all-expense-paid trip to Cleveland, where they will attend the distributors meeting to be held in February.

MEMBERS AND FRIENDS OF DETROIT A. S. R. E. PLAY AT WALDENWOODS

Approximately sixty members of the Detroit section of the American Society of Refrigerating Engineers and their friends attended the week-end frolic held at Waldenwoods, about fifty miles from Detroit, on Saturday afternoon and Sunday, Sept. 8 and 9.

No definite program of entertainment was provided and there was no business session.

Following the dinner Saturday evening, C. H. Tanger, chairman of the committee in charge of arrangements, called on C. C. Spreen for a talk on the history of Waldenwoods. Mr. Spreen in turn called upon F. M. Cockrell, editor of the News, as one who had followed the activities in connection with Waldenwoods since its beginning.

Mr. Cockrell outlined briefly the formation of the Cromaie Society under the leadership of J. Robert Crouse and B. G. Tremaine, and the building of Waldenwoods by that society as a place where the members of three or four industries, including electric refrigeration, might get together and become acquainted with each other and in that way perhaps put competition within a particular industry on a more friendly basis.

Following is a list of those who attended the get-together:

Absopure Frigidaire Co., Detroit—V. Krone, H. C. Hayes.
Copeland Products Co., Detroit—H. Brysselbott, D. B. Henry.
Detroit Edison Co., Detroit—A. D. McLay.
Detroit Ice Machine Co., Detroit—B. F. Belshaw.
Electric Refrigeration News, Detroit—F. M. Cockrell, G. N. Congdon, H. J. Moore.
Flintlock Corp., Detroit—H. I. Phillips.
Frigidaire Corp., Dayton—L. S. Keilholtz, H. G. Wallace.
General Electric Co., Cleveland—L. F. Gesler, C. E. Wahl, H. A. Wilding.
Heideman Expansion Valve Co., Detroit—F. J. Heideman.
Kelvinator Ltd., London, Eng.—R. Searle.
Kelvinator Corp., Detroit—W. D. Mercer, C. C. Spreen, M. J. Morell, A. G. Morell, W. C. Devers, C. H. Tanger, D. A. Ellis, T. M. Gillespie, C. D. Leeson, A. Haske, R. H. Swartz, John Wyllie, W. J. Smith, G. L. Spring, C. Butt, A. Frohnapel, R. Martin, R. Warnock, P. J. Smith, T. Buechler, T. H. Nutter, N. J. Bohn, R. A. Lundquist, R. Doeg, W. Gifford, R. K. Braun, G. Oswald, B. F. Wright, P. D. Parker, C. J. Ardussi, F. A. Lind.
Leonard Refrigerator Co., Grand Rapids, Mich.—R. C. Kent, A. D. McCaughna.
Manhattan Rubber Mfg. Co.—L. Thompson.
McCord Radiator & Mfg. Co., Detroit—R. M. Hyde.
Norge Corp., Detroit—R. J. Nelson, H. Rollin, F. B. Riley & Associates, Detroit—F. B. Riley.
Smith, Hinchman & Grylls, Detroit—M. C. Kern.
Universal Products, Detroit—W. Hill.
Wagner Electric Co., St. Louis—Roy Wells, and H. W. Petti.
Wolverine Enameling Co., Detroit—M. C. Baker, C. H. Brodt.

Milwaukee Firm Increases Capitalization

The Electric Refrigerator Co., Milwaukee, Wis., has increased its stock from \$15,000 to \$50,000.

Copeland St. Louis Co. Organizes the "Royal Order of Billy Goats"



"Wait for the salesman with the moustache." This was the message flashed out by R. M. Billhimer, general sales manager of the Copeland St. Louis Co., when he launched his "Royal Order of Billy Goats."

It all started when the Copeland factory put on a national distributors' contest. Mr. Billhimer, looking for a scheme to pep up his force, bethought himself of a plan, and forthwith the Royal Order of Billy Goats was born.

The members, at initiation, pledged themselves not to shave their upper lip

until they had made "quota." And then Mr. Billhimer addressed a general letter to all prospects, telling them to "wait for the salesman with the moustache."

The picture shows the entire St. Louis chapter. Top row, left to right: R. C. Rgdon, John L. Bass, Dan N. Moyle, H. C. Sorber, William Meyer, Louis T. Hoerr, F. J. Martin. Bottom row, left to right—C. M. Marshall, sales manager; R. M. Billhimer, general sales manager; Harold L. Maxey, Fred A. Schmidt, John R. Hearle, A. P. Crook. And the sales lady in the center is K. I. Guffey.

INSULATING MATERIAL IS MADE OF BY-PRODUCTS FROM PAPER INDUSTRY

There are numerous examples of the advantageous use of by-products in American industry and an interesting one of these to the refrigeration engineer is the production of an insulating material as a by-product of the paper industry.

In paper plants, manufacturing their product from wood pulp, there is a certain percentage of long, tough spruce fibre that cannot be dissolved and which for many years was considered only as waste. Someone discovered that by treating these fibres with a water-proofing compound and a preservative, they could be compressed so as to form an insulating board which is now known as Insulite.

This product, manufactured in mills at International Falls, Minn., and at Fort Frances, Ontario, is claimed as the pioneer board form insulation. Following the introduction of this insulating board the demand increased to such an extent that it was found possible to use other sound wood fibres to augment the coarse fibre obtained from the paper mills.

The main business of the Insulite Co. is the manufacture of a 1/2-inch board insulation which is entirely odorless, is very resistant to decay and decomposition, has a tensile strength exceeding 250 pounds to the square inch and which can be accurately cut to specifications of thickness and size.

At the present time cabinets for General Electric refrigerators being manufactured in the plant at Schenectady, are using Insulite, several thicknesses of which are joined together and inserted between the outer shell and the inner lining. Because of the structural strength of the insulation no wood frame is necessary.

Of timely interest is the selection of Insulite by Commander Byrd to be used in the construction of small portable houses which will protect the members of the Byrd Antarctic Expedition from extremely low temperatures and high winds.

The walls of the houses, six of which are now enroute, are made up of a loose insulating material in the center held in place by thicknesses of Insulite insulation which also provides the necessary structural strength.

Another use for Insulite is in railway refrigerator cars where four or five thicknesses are used together to provide the necessary insulation. Insulite has been given a thermal conductivity rating of 7.1 BTU's per twenty-four hours, per degree Fahrenheit difference in temperature per square foot, one inch thick, by the United States Bureau of Standards.

In addition to its insulating effects, Insulite has acoustic properties which may be used for sound deadening purposes. It is applied in large or small pieces to the ceilings or walls of rooms and when left in its natural state or treated with a stain that will not close the pores of the material, will fully eliminate echoes and reverberations as well as provide an attractive covering.

Connelly Co. To Hold Dealer Meetings at Great Falls and Billings

Two dealers' meetings are soon to be held by the F. B. Connelly Co., General Electric distributors in Billings, Mont. The first will be in Great Falls on Sept. 17 and the second in Billings on Sept. 19. An extensive program has been arranged and will include addresses by officials of the G. E. refrigeration department at Cleveland.

Western Nebraska G. E. Dealers Attend School at North Platte

Twenty General Electric dealers of western Nebraska attended a factory demonstration and sales school held at North Platte, Nebr., on August 16.

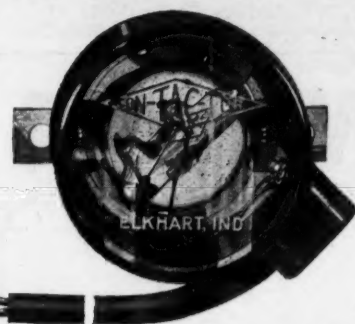
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ALASKA'S
51st
YEAR

No. 46 and No. 46B—No. 47 and No. 47B. Enameled steel exterior—white enamel.
Seamless porcelain lined. For multiple installations.

It offers more

THE distributor earnestly desires of outselling his market gives the cabinet an important place in his plans. Study the records and see what Alaska Cabinets are doing to make good units excel expectations. Now a new convenience feature exclusive with Alaska gives the specially designed complete Alaska line an overshadowing advantage. Nothing in the field approaches it. Get the facts and convince yourself.

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Chicago, Ill. 1500 American Furniture Mart Bldg.
Dallas, Texas, Santa Fe Furniture Mart

Detroit, Mich. 2842 W. Grand Blvd.
Minneapolis, Minn. 603 Lumber Exchange
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DRINKING WATER FAUCETS

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Refrigerators - Water Coolers
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Mineral Wool

assures

Perfect Insulation
for
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The low thermal conductivity necessary for maximum insulating efficiency is ideally supplied by this indestructible, vermin-proof and entirely mineral material.

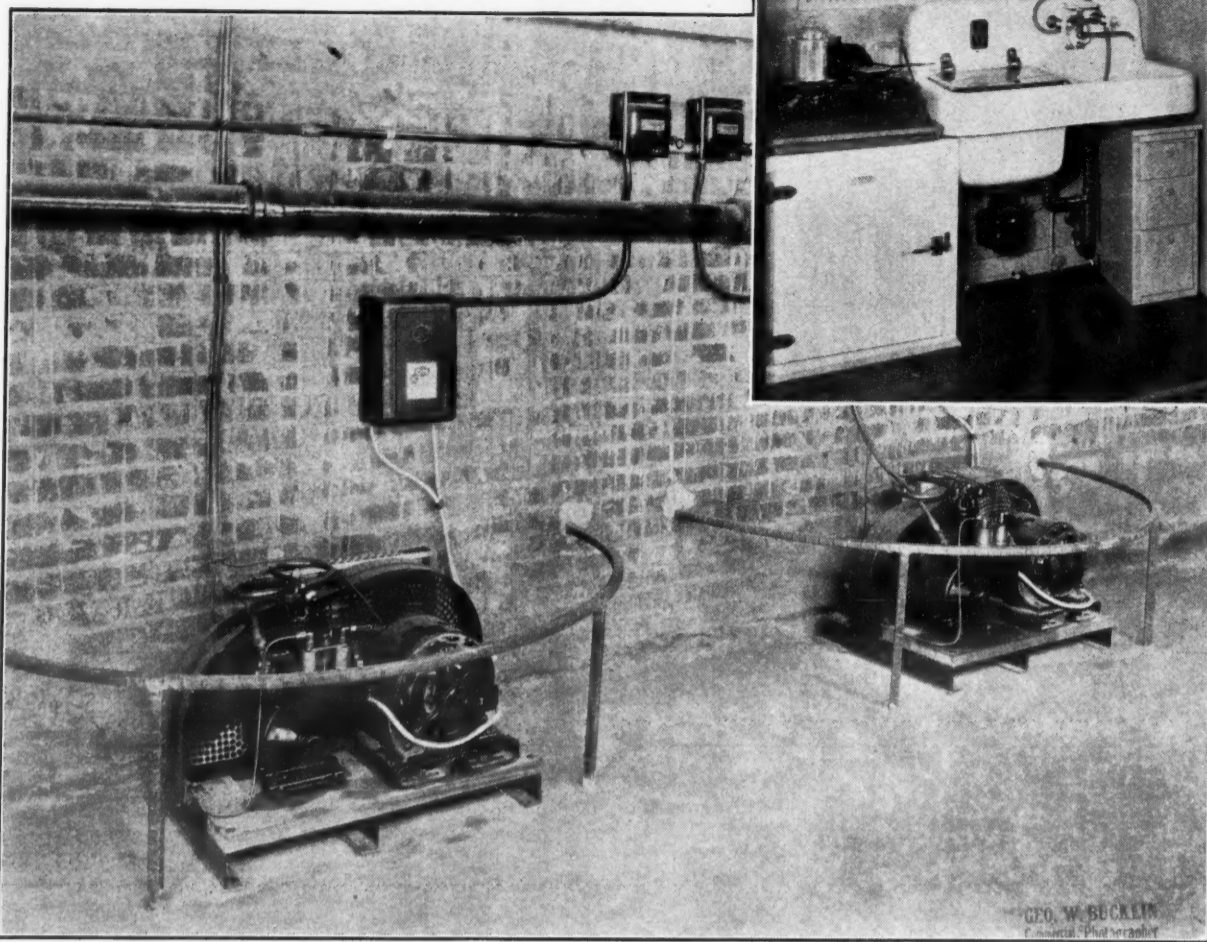
Mineral Wool is rated 6.3 B. T. U. by the U. S. Bureau of Standards and the low cost makes its use a real economy.

Send for sample and descriptive folder.

U.S. MINERAL WOOL CO.

280 Madison Avenue, New York
Western Connection: Columbia Mineral Wool
Co., South Milwaukee, Wis.

Four Kelvinator Units Serve 38 Kitchenettes in Lincoln, Nebraska



Kelvinator condensing units supplying refrigeration for one of thirty-eight similar kitchenettes in the Eagle Apartments at Lincoln, Nebr., are shown in the photograph above. A second battery of condensing units identical to the one shown here makes a total of four Model

LB air-cooled machines. The necessity for the use of four machines of 3/4 H. P. each, is explained by the fact that the apartments are all located on the third and fourth floors of the building and an unusually long run of tubing is necessary. Thirty-eight Model No. 2271 Kelvina-

tor apartment house cabinets are used. A Kohler electric dishwasher is also included as standard equipment. The installation was made by Rudge & Guenzel Co., Lincoln, Nebr., under the supervision of C. M. Harris.

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Stampings
Cooling Units
Angle Iron
Bases
Brine Tanks
Ice Cream
Cabinets

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FLINTLOCK CONDENSERS

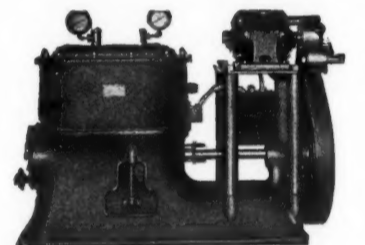
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Greater Efficiency
at Less Cost

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You need the PEERLESS line of commercial units. PEERLESS units give you a COMPLETE line, ranging from 1 to 10 tons.

Fifteen years of successful manufacturing and merchandising of ice machines are behind the PEERLESS name. Our record warrants your most exacting investigation.

Write or Wire

PEERLESS ICE MACHINE CO.

515 W. 35th St.
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One-Piece

There is only one one-piece porcelain enamel. Tenacious, fused into metal, it is the foundation of all durable refrigeration installations. May we tell you why? Porcelain Enamel & Manufacturing Company, Baltimore, Md.



FIRE UNDERWRITERS REVISE REGULATIONS FOR MULTIPLE SYSTEMS

(Concluded from Page 1, Column 1)

per tubing of not less than .034 inch wall thickness installed in standard pipe or approved rigid metal conduit equal to rigid electrical conduit. The minimum wall thickness of tubing herein specified is for diameters not exceeding one-half inch. Where tubing of greater diameter is used the wall thickness of tubing shall be correspondingly increased.

Where this method is employed the following requirements shall be complied with:

1. Material other than standard pipe or approved rigid metal conduit for making bends and outlet connections shall be restricted to approved flexible conduit, not exceeding 6 feet in length, and equal to flexible electrical conduit.

2. All rigid or flexible conduit shall terminate in approved terminal fittings, which shall be sealed with a material, the sealing proportions of which are not affected by moisture or the temperature of the lines.

3. Tubing run in conduit shall be rigidly supported in such a manner as to remove strain at joints and connections.

4. Where tubing is run in conduit all valves and service connections shall be rigidly secured in approved metal outlet boxes.

6. Joints.

(a) Pipe joints shall have standard pipe threads and shall be made up with material suited to the refrigerant employed.

(b) If flanged fittings are used for pipe connections they shall be of recessed gasket type.

(c) All joints in copper tubing shall be of sweated types, except that flared joints may be used for tubing not more than 1/2 inch in diameter and where the required test pressure does not exceed 180 pounds.

(d) All joints in tubing shall be accessible.

7. Valves and Fittings.

(a) All valves and fittings on the high pressure side of the system shall be forged or shall be semi-steel castings. Valves shall be fitted with a hand wheel or other means of ready operation permanently attached thereto.

(b) Shut-off valves shall be installed at the following locations: At each service outlet in pressure and return lines and in each riser or manifold connection at or near the compressor.

(c) Service outlets shall be so located as to be accessible to one standing on the floor.

(d) Shut-off valves shall be installed in both connections to every evaporator in

such a manner as to permit the removal of the evaporator with valves attached.

8. Service Connections.

(a) Not more than a single tenant shall be supplied from an outlet box on a main riser. Such outlet box shall be located within the premises of the tenant served and so arranged as to be accessible at all times.

(b) No outlet or junction box shall be permitted in any hallway, stairway or vertical shaft not cut off at each story. Elevator, dumbwaiter or other shafts containing moving objects shall not be used for outlet or junction boxes, nor for tubing or piping carrying refrigerant.

(c) Every refrigerator shall be rigidly secured in place.

9. Safety Features.

(a) Each compressor drive shall be provided with a device which will automatically stop the compressor at a pressure not in excess of the test pressure as specified by Section 10.

(b) Where ammonia or carbon dioxide are used every high pressure side or liquid receiver which can be shut off shall be equipped with a pressure relief device discharging into the low pressure side of the system or to the outside of the building. Where the relief from the high pressure side is into the low pressure side the latter shall be protected by a relief device discharging to the outside of the building or to a suitable absorber.

(c) Refrigerant piping or conduit carrying refrigerant lines shall be conspicuously marked or labelled so as to plainly indicate its contents.

(d) Every compressor shall be so enclosed as to afford protection against mechanical injury.

(e) At or near the entrance to the room in which the compressor is installed there shall be provided an approved gas mask.

10. Test Pressures.

Every multiple system except pressure gauges and control mechanism, shall be designed for and tested to withstand safely and without injury the following required minimum test pressures:

Refrigerant Used	High Side Part Lbs. per Sq. In.	Low Side Part Lbs. per Sq. In.
Carbon dioxide	1500	750
Ammonia	300	150
Methyl Chloride	180	80
Sulphur Dioxide	135	50
Iso-butane	130	50
Butane	75	35
Ethyl Chloride	50	35
Methylene Chloride	15	15

11. Instructions.

(a) Printed instructions covering the operation and maintenance of the system and what to do in emergencies shall be permanently posted at riser control valves.

(b) It is recommended that such instructions include a diagrammatic sketch of the system with the parts labelled for reference.

August 9, 1928.

SERVEL SALES UP

Automatic Refrigeration Industry on Sounder Basis, Smith States

Colonel Frank E. Smith, president of Servel, Inc., manufacturers of Servel electric and Electrolux gas-operated refrigerators, announces that August sales exceeded the estimated quota and were ten per cent greater than July sales. Sales for July and August showed a gain of 33 1/3 per cent over the same two months last year.

Colonel Smith stated that the gas utility companies are intensifying their sales efforts on the new gas refrigerator in all parts of the country, as it is the first new important domestic appliance the industry has had in several years. A large and increasing part of the gas refrigerator sales is for new apartment houses where the noiseless feature is especially important, he said.

"Despite the existence of unfavorable competitive conditions within the industry itself, automatic refrigeration has had its most successful business this year and is rapidly attaining a sounder position from a technical and manufacturing standpoint as well as regards public acceptance," Colonel Smith stated. "There is every indication that the automatic refrigerator is rapidly passing as a luxury commodity of seasonal demand and becoming a year-round necessity. This will go a long way to eliminate some of the seasonal peaks which have existed in this business. Cultivation of the export market particularly in the southern hemisphere where the seasons are reversed is also helping materially to fill in the off-season valleys."

MONTHLY NEWS SHEET TO GO TO KELVINATOR SERVICE MEN

Kelvinator Corp., Detroit, is now issuing each month a four-page folder called "Kelvinator Service News."

The first issue, which appeared in August, announces the Kelvinator Service Club, the members of which will be identified by an attractive button to be fastened in the coat lapel.

Announcement is also made of the new Kelvinator service manual in 8 1/2 x 11-inch size, divided into three sections: domestic, commercial, and ice cream cabinet equipment.

E. P. Goodison Heads Kelvinator-Philadelphia Service Dept.

E. P. Goodison, formerly service manager for Kelvinator-Leonard Corp., Pittsburgh, has resigned to accept the same position with Kelvinator-Philadelphia, Inc.

Reliable
TRADE MARK
CORKBOARD
Manufactured by
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LEADING Refrigerator manu-
facturers use Monel Metal
screws with Monel Metal trim.
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and 24"x36" sheets, in 1", 1 1/2",
2", 3", and 4" thicknesses. Shipped
in strong fibre containers, each con-
taining 72 board feet. Samples on
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ROME CONDENSERS

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Rome Turney Radiator Co.
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FORGED BRASS VALVES
for Mechanical Refrigeration
Quality Shut-off and Cylinder
valves in any standard designs
or to your specifications.
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Two of the largest refrigerator
plants in the country use Ferro
Enamels and Equipment.
That's why it will pay you to
write today for "Men and Meth-
ods." It's free.
The Ferro Enamel Supply Co.
CLEVELAND, OHIO

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manufacturers are buying
BOSLEY'S
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for it is the best uniform
quality insulation
Write us
The D. W. Bosley Company
1901 Carroll Ave. Chicago, Ill.

German Literature on Refrigeration

EDWIN O. GRAEFFE
773 East Grand Boulevard
Detroit, Mich.

September 9th, 1928.

ELECTRIC REFRIGERATION NEWS,
Detroit, Mich.

The result of my article, which appeared in your August 1st issue has been rather surprising. I expected to find quite a large interest in the development of refrigeration of trains, whereas I expected the literature to be more or less generally known, since I only mentioned books which might be considered as classics to the electric refrigeration field. Just the contrary happened.

I may sum up the general viewpoint regarding refrigeration of trains by quoting from one letter received, which reads as follows:

"The particular development you appear to be interested in may at some future time be interesting in this country, but at the present time it is quite largely theoretical in conversation only. . . . and further 'not interested in . . . development . . . which has proven satisfactory technically, but not commercially practicable.'"

I can only reply that in Europe this one firm has made a commercial success of train-refrigeration and I am quite ready to prove it to any party which might be interested.

The books I mentioned seem to be a revelation to most of your readers, therefore I want to give you more details, so that your readers can order the books through any book-seller who imports foreign books.

Die Kaeltemaschine, Grundlagen, Berechnung, Ausführung, Betrieb und Untersuchungen von Kaelteanlagen von Dipl.-Ing. M. Hirsch.

Verlag von Julius Springer, Berlin, 1924.—RM21.

This book goes into the details of every kind of refrigeration, but it is written for engineers who are thoroughly schooled in the field of refrigeration and cannot be understood by a layman. The book is divided in four parts: the principles of refrigeration, the calculation, the construction, and the operation. Each part goes into all known scientific details with a wonderful computation of useful data and tables.

Die Eis- und Kaelteerzeugungs-Maschinen, ihr Bau und ihre Verwendung in der Praxis. Ein Kompendium der gesamten Kaelteindustrie von Dipl.-Ing. Richard Stetefeld. III Auflage.

Verlag von Konrad Wittwer, Stuttgart, 1927.

This book, which appeared first in 1901 and had a second edition in 1912 and the third edition in 1927, is much clearer and can more readily be understood by anybody interested in electric refrigeration, than the book of Hirsch. It goes into the details of many commercial applications and shows better than any other book how great the field of refrigeration is and at that the book cannot be considered a complete "Kompendium," as comparatively very little is said about the strides of the American refrigeration industry.

Taschenbuch fuer Kaelte-Techniker. 8te vollstaendig neubearbeitete Auflage begruendet von Geog. Goettsche fortgesetzt und neuherausgegeben von Dipl.-Ing. Walther Pohlmann, Altona.

Hanseatische Verlagsanstalt, Hamburg, 1922.—RM4.

This is a kind of vade-mecum for refrigerating engineers: full of useful data and short-cuts for calculation and computation of loads with many practical hints. For some students it will be disillusioning to find that some of "latest constructions" of some manufacturers have been commonplace in the old country for the last ten or twenty years. Some figures found in that book might be disconcerting to some people when they read that "compressors of SO₂ machines need no oil" and "the SO₂ consumption per year of a 6 ton SO₂ machine is about 65 lbs., whereas a 150 ton SO₂ machine consumes about 650 lbs. per year." It might be quite interesting that although copper expansion coils are regarded as advisable, it is quite common to use finned coils of cast-iron for the low side of SO₂ machines. But, of course, don't forget that most of the computation result from experience with "big machines."

Die Eis- und Kuelmaschinen, Ihr Wesen, Betrieb und Wartung von F. W. Hoffmann. Dritte erweiterte Auflage. A. Ziems Verlag, Wittenberg, (Bez. Halle) 1926.—RM12.

Of all books mentioned this one can be most readily understood and it is written more or less as an introduction in the field of electric refrigeration and refers principally to the medium size commercial refrigeration problems. This is not a strictly scientific book, it is just a report of the experience of a practical engineer. His computations are, in my opinion, fallacious, because they are only made for a series of problems common in the German field. It is quite interesting to find that he advocates combined direct and indirect expansion systems for walk-in refrigerators for meat-markets. There are very few manufacturers here

who have successfully combined the tank system with direct expansion finned coils. On the other side Hoffmann hardly visualized automatic machines.

Stoerungen an Kaeltemaschinen, insbesondere deren Ursachen und Beseitigung von Oberingenieur Eduard Reif. II Auflage.

Verlag von Otto Spamer, Leipzig, 1925.—RM9.

This is a service manual which should prove very useful to any service manager. It is exactly what the title says. It refers to NH₃, to SO₂ and to CO₂ machines, their troubles, the causes and the servicing. Many good suggestions are made, though the service manual of most manufacturers are more complete.

I find that the same author has written recently a book entitled: "Kleinkuehlanlagen fuer Gewerbe und Haus." I do not possess this book, but I presume it has been published by the same, firm as above-mentioned.

Die Kaelte-Maschine in der Milch-wirtschaft, ihre Konstruktion Wirkungsweise und Behandlung von Alb. Fischer, Bergedorf.

Verlag der Molkerei-Zeitung, Hildesheim, 1927.—RM4.50.

This is, of course, a special book referring to nothing but milk-coolers; it is only interesting to those who specialize in this problem.

At last I would like to refer to a little book written this year by Prof. Robert Planck Karlsruhe. I believe it is entitled:

Die Kleinkaeltemaschinen by Prof. R. Planck.

Verlag der Zeitschrift des V. D. I., 1928.—RM7.

but I am not quite sure, as I only saw an advance print.

This last book is the result of a three months' trip through the U. S. A. last year. Prof. Planck visited many manufacturers of small refrigerating machines here in the States and makes comparisons between the American and the European machines. Prof. Planck is one of the foremost scientists in the field of refrigeration and his book is undoubtedly worthwhile reading, though in this particular case Prof. Planck mostly computed facts about existing machines, without trying to solve any problems.

It might interest the readers to hear that Prof. Planck is in favor of compression machines for household and for small commercial installations. This is remarkable because a little less than five years ago, when most of the German refrigeration experts met they discussed the question "compression or absorption machines" and at that time all, including Prof. Planck, were of the opinion that the future of the small refrigeration machines would be in the absorption field.

That shows how condition may change in a short time and that science is truly international. Let us all profit by the experience of the other nations. After all, we all like to believe that we are doing better than others and that we are far ahead in our field, but if we study the question a little more deeply, we'll find that everywhere one or the other contribution has been made which means a step forward on the scale of progress.

Before ending this article, I would like to show by an example how sometimes money and time are wasted in research work, when people fail to study and to find out what other people have done. I recently found that an English firm took out a patent in Germany for a refrigerating device, which has been in constant use here in America for more than 10 years. I have no reasons to doubt the bona fide of the English firm, which must have spent lots of money and time to perfect this device. A little study of American patents would have saved them all their troubles, they would have found even improvements on the device matured by practical experience in the field.

I remain, dear Editor,

Yours very truly,
EDWIN O. GRAEFFE.

P. S.—As far as possible I mentioned the prices of the books, i. e., the price I paid in Germany in R. M. (Reichsmark) RM4.20—\$1.

QUESTIONS AND ANSWERS

"A Subscriber," Aurora, Ill.—We make it a rule not to publish anonymous letters and obviously such communications cannot be answered direct. Please furnish your name and address. Your name will not be revealed, if you request that it be kept confidential, but we must have information for our own protection. It is necessary that we know the source of everything published in the NEWS.

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Prizes Presented to Frigidaire Men at Boston Meeting

Between 250 and 300 Frigidaire dealers and salesmen from Eastern New England territory attended a one-day convention held at the Copley-Plaza hotel in Boston, Mass., on August 20. H. W. Newell, general manager of the New England territory, and S. R. Prugh, zone manager, addressed the meeting.

H. A. Crowley, of Boston, and J. K. Lutz, of New Bedford, were presented with Chevrolet cars for outstanding sales achievements in that territory. In addition more than \$1,000 in cash was distributed to other leading salesmen.

Correction

In describing an installation of Cope-land condensing units, photographs of which appeared on page 12 of the August 15 issue of the NEWS, the impression was given that both installations were equipped with American Radiator controls.

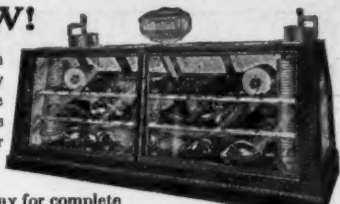
This is incorrect since the lower installation is equipped with a dual control manufactured by the Penn Electric Switch Co., Des Moines, Iowa.

Manitowoc, Wis., Dealer Has Display at County Fair.

The Manitowoc Frigidaire Co., Manitowoc, Wis., is reported to have had an excellent display at the Manitowoc County Fair which was held in that city the last week in August.

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